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A COMPARATIVE STUDY OF THE EFFECT ON ANXIETY OF CHLORPROMAZINE,[1] RESERPINE,[1] PHENOBARBITAL, AND A PLACEBO

HENRY ROSNER, M.D., SOLOMON LEVINE, PH.D., HOWARD HESS, M.D., AND HARVEY KAYE, M.D.

Chlorpromazine and Reserpine have recently achieved extensive application in the management and treatment of psychiatric disorders (14). The tranquilizing effects of these drugs in the relief of emotional tension and anxiety have been reported in clinical and research studies (5), (11). Winkelman (13), in a study of 142 patients, found that severe anxiety and tension states responded well to Chlorpromazine. He observed that "of 67 patients manifesting typical severe anxiety reactions, 46 showed improvement ranging from moderate to complete relief of symptoms." In studies by Brill (1), Kline (6), and Miner (9), Reserpine has similarly been found to give symptomatic control and relief from anxiety and emotional tension. The utilization of a barbiturate compound such as Phenobarbital for its tranquilizing action has had long and extensive application in the management of emotional and mental disturbances.

This investigation was undertaken to provide a controlled study of the effectiveness of Chlorpromazine and Reserpine on symptomatic manifestations of anxiety, compared with Phenobarbital and a placebo. The purpose of this investigation was to determine the effect of these drugs upon overt anxiety and tension as revealed in subjective, psychiatric, psychophysiological and psychological measures. The placebo constituted a fourth group and served as a control.

[1] Thorazine and Serpasil, respectively.

EXPERIMENTAL DESIGN

Physical set up

This study was conducted on the Psychiatric wards of the Veterans Administration Hospital, Brooklyn, New York.[2] This is a 1,000 bed general hospital with 120 psychiatric beds. Patients are admitted to the psychiatric wards on a voluntary basis. They are generally patients for whom a treatment goal is anticipated within a relatively short period of time and who do not require prolonged chronic hospitalization.

Selection of patients

The population for this study was drawn from all psychiatric admissions from July, 1954, to April of 1955. Each patient was seen within 24 hours of admission and placed on one of the drugs or a placebo in strict order of admission. Patients in immediate need of somatic treatment or extensive sedation and those with a toxic organic psychosis were excluded.

Drug dosage and administration

The drugs used were Chlorpromazine, Reserpine, Phenobarbital and a placebo which served as a control. The identity of the preparations was known only to the pharmacist throughout the entire experimental period.

[2] This research was completed through the cooperative efforts of the Neuropsychiatric Service, Julius Barasch, M.D., Chief, and Herman R. Weiss, Ph.D., Chief Clinical Psychologist.

They were designated by code names and were so known by the investigators and all ward personnel. All of the drugs were administered in identical red gelatin capsules. Daily dosages were as follows: Phenobarbital, 120 mg.; Reserpine, 2 mg.; Chlorpromazine, 100 mg.; placebo, 3 grains of lactose. The capsules were given in divided dosages at 9:00 a.m., 1:00 p.m., 5:00 p.m. and 9:00 p.m. and were administered daily for 30 days. All patients were evaluated with the same measures before and after the completion of the 30-day course of treatment. During this 30-day period all patients participated in the normal hospital regimen except that no sedation or somatic therapy was administered. In the event that such treatment was required, the patient was removed from the experimental study.

Description of patient population

The total population for this study comprised 84 patients who completed the 30-day course with one of the four capsules. The number of patients and diagnostic distribution for each group are shown in table 1. As revealed in this table, the diagnostic classifications included 65 patients with psychotic disorders, 15 with neurotic disorders, and four with character disorders. The mean age, educational achievement and intellectual status of each of the four groups of patients are reported in table 2. The age range of the total population was from 18 to 60 with mean ages of 30.76 for patients in the Chlorpromazine group, 31.62 for Phenobarbital, 34.73 for Reserpine and 32.14 for placebo. It is apparent that the groups as finally constituted are comparable with respect to age, education, I.Q. and diagnosis. Thirty-one patients who started on one of the four drugs did not complete the 30-day course and are not included in the final analysis. Of these, 16 were too agitated, three required immediate somatic therapy, six were discharged against medical advice and six were discontinued for miscellaneous reasons. The discontinued group included 12 who started with Phenobarbital, nine with Reserpine, six with Chlorpromazine and four with placebo.

TABLE 1.—DIAGNOSTIC COMPOSITION OF THE FOUR GROUPS

Diagnostic Classification	Phenobarbital	Placebo	Reserpine	Chlorpromazine
Psychotic disorders	14	15	16	20
Schizophrenia	13	13	15	20
Psychotic depression reaction	1	1	0	0
Paranoid state	0	1	1	0
Neurotic disorders	2	5	4	4
Anxiety reaction	1	2	2	3
Dissociative reaction	0	1	0	1
Conversion reaction	1	0	1	0
Depressive reaction	0	2	1	0
Character disorders	0	1	2	1
Totals	16	21	22	25

TABLE 2.—MEAN AGE, EDUCATION AND I.Q. OF THE FOUR GROUPS

Drugs	N	Age	Education	I.Q.
Phenobarbital	16	31.62	11.69	102.00
Placebo	21	32.14	10.53	97.32
Reserpine	22	34.73	9.70	102.62
Chlorpromazine	25	30.76	11.20	107.00

PROCEDURES

Prior to starting medication, each patient was seen by the investigators. Subjective, psychiatric, physiological and psychological methods were employed in evaluating the level of manifest anxiety and tension prior to the onset of treatment. These same measures were repeated upon completion of the 30-day course of oral administration of the drugs and placebo. The following measures were utilized in this investigation.

1. *Patients' self-rating scale.* Patients rated their own feelings of anxiety and tension on a seven point scale, 0 representing "no anxiety or tension" and 6 indicating "extremely nervous or tense". The patients' self-rating scale and instructions given are as follows:

Patients' Self-Rating Chart

0 1 2 3 4 5 6

Completely relaxed, no nervousness, worry or tension — Moderately nervous, worried or tense — Completely worried, nervous or tense

"It is common for people to feel nervous, worried, jumpy or just generally tensed-up in a situation of this sort. Above is a scale which measures how you feel with respect to the above.

For example, an individual who is completely relaxed and free from the above feelings would place a mark at the left side of the scale at number 0. On the other hand, an individual who is very nervous, worried or tense at this particular time would place a mark at the right side of the scale at number 6.

Please indicate your own feelings at present by placing a mark at any point along the scale which best describes how you feel. You may put your mark at any point that you feel is the appropriate one; it need not be directly on a number."

2. *Psychiatric anxiety rating scale.* The examining psychiatrist prepared an over-all rating of the patient's level of anxiety and tension utilizing the seven point scale described under "Patients' self-rating scale".

3. *Manifest symptom inventory.* A psychiatric screening interview was conducted with each patient to evaluate the status of his anxiety and tension. A manifest symptom inventory listing 21 overt symptoms of anxiety was verbally presented to each patient. The following symptoms were studied:

Manifest Symptom Inventory

	Yes	*No*		*Yes*	*No*		*Yes*	*No*
Palpitation	——	——	Faintness	——	——	Insomnia	——	——
Tires easily	——	——	Apprehensiveness	——	——	Unhappiness	——	——
Breathlessness	——	——	Paresthesias	——	——	Shakiness	——	——
Nervousness	——	——	Flush of face	——	——	Headaches	——	——
Chest pain	——	——	Weakness	——	——	Blurred vision	——	——
Sighing	——	——	Trembling	——	——	Giddiness	——	——
Dizziness	——	——	Breath unsatisfactory	——	——	Dryness-face	——	——

4. *Critical flicker fusion (CFF).* The relationship between flicker fusion threshold and anxiety level has been demonstrated by the work of Krugman (7) and Buhler (3). Previous research with the critical flicker fusion (CFF) test has concluded that this instrument is "a valid sensitive index of anxiety level." More anxious subjects have been found to possess a lower threshold for flicker fusion. The hypothesis is that when a flickering light at increasing frequency is presented, high anxiety subjects will perceive the flickering stimuli as stabilizing or fusing sooner than low anxiety subjects. It would be expected therefore that the critical flicker fusion score would rise during the progress of a successful treatment.

The CFF test was included as a measure of evaluating levels of anxiety before and after the administration of the drugs and placebo employed in the study. The apparatus used to measure CFF was a General Radio Company "Strobotoc", Model 631-A, which produces a variable oscillating light with a range of 600 to 14,500 cycles per minute. The present study followed the experimental conditions prescribed by Krugman (7). The final score at each testing was determined on the basis of 10 trials and expressed in frequency cycles per second.

5. *Blood pressure.* Blood pressure determinations were recorded before, during and after the course of treatment.

6. *Weight.* Weight determinations were taken before, during and after the 30-day course of treatment.

Results

1. *Manifest symptom inventory.* Table 3 presents pre- and post-treatment data on manifest symptoms obtained from the four groups of patients. This table contains the mean number of symptoms reported by patients before and after treatment, the difference between these two means, the standard deviation of this difference, and the ratios indicating the significance of this difference. It also reveals that the patients in the Reserpine group started with a mean of 8.95 symptoms and had a mean of 4.77 symptoms after completing the treatment. Following the 30-day course of treatment these patients reported a diminution in the number of symptoms equal to a mean of 4.18. The t ratio of 3.27 indicates that the

TABLE 3.—Manifest Symptom Inventory Means, Standard Deviations, Mean Differences and t Ratios

Drugs	N	Means		Mean Diff.	Standard Deviation	t Ratios
		Pre	Post			
Phenobarbital	15	10.47	7.13	−3.33	2.25	5.55*
Placebo	21	10.71	7.29	−3.43	7.17	2.14†
Reserpine	22	8.95	4.77	−4.18	5.85	3.27*
Chlorpromazine	25	10.44	6.64	−3.80	5.09	3.65*

* Significant at the .01 level.
† Significant at the .05 level.

TABLE 4.—PATIENT SELF-RATING MEANS, STANDARD DEVIATIONS, MEAN DIFFERENCES AND t RATIOS

Drugs	N	Means		Mean Diff.	Standard Deviation	t Ratios
		Pre	Post			
Phenobarbital	16	4.50	3.50	−1.00	1.72	2.27*
Placebo	21	3.86	2.86	−1.00	2.29	1.96
Reserpine	22	4.23	2.57	−1.66	2.36	3.19*
Chlorpromazine	25	3.94	2.34	−1.60	1.90	3.81*

* Significant at the .01 level.

TABLE 5.—PSYCHIATRIC RATING MEANS, STANDARD DEVIATIONS, MEAN DIFFERENCES AND t RATIOS

Drugs	N	Means		Mean Diff.	Standard Deviation	t Ratios
		Pre	Post			
Phenobarbital	16	3.94	3.56	−0.38	0.99	1.47
Placebo	21	4.29	3.10	−1.19	1.68	3.13*
Reserpine	22	3.77	2.95	−0.82	1.37	2.73†
Chlorpromazine	25	4.28	2.62	−1.66	1.87	4.37*

* Significant at the .01 level.
† Significant at the .02 level.

difference between the means is significant at the one per cent level of confidence. This would indicate that the chances are only 1 out of 100 that the obtained difference could occur on the basis of chance variation.[3] Further reference to table 3 indicates that the difference between the pre- and post-means in the Chlorpromazine and Phenobarbital groups were similarly significant at the one per cent level of confidence. The placebo mean difference proved significant at the five per cent level of confidence. Thus, there were significant differences in reported symptoms before and after the administration of each of the four drugs employed in this study.

When further comparisons were made between drugs, the difference between the drugs was not found to be significant. When for example, the results of the placebo were compared with each of the three other groups, none of the differences between drugs were significant. Thus, the results did not favor any single drug.

2. *Patient self-rating scale.* Table 4 presents the before and after treatment data on the self-rating anxiety scale completed by patients in each of the four drug groups. Patients in the Phenobarbital, placebo, Reserpine and Chlorpromazine groups revealed a mean rating of 4.50, 3.86, 4.23 and 3.94, respectively, at the onset of treatment and 3.50, 2.86, 2.57 and 2.34 at the termination of treatment.

Though all groups reported a decrease in over-all anxiety, the placebo reduction is not significant. Significant differences, at the one per cent level of confidence, between the pre- and post-treatment mean ratings were found in the Chlorpromazine and Reserpine groups, and at the five per cent level for the Phenobarbital group. When the groups were compared with each other, no significant differences were found.

3. *Psychiatric anxiety rating scale.* Table 5 shows the pre- and post-treatment anxiety ratings prepared by the psychiatric examiners. Examination of column 3 of this table provides pre- and post-mean difference values of −1.66, −1.19, −.82 and −.38, respectively, for Chlorpromazine, placebo, Reserpine and Phenobarbital. The over-all psychiatric rating noted reductions in anxiety level in each of the four groups of patients. The mean difference in psychiatric rating in the Chlorpromazine and placebo groups proved significant at the one per cent level and at the two per cent level for the Reserpine group.

In the inter-group comparisons, significant differences were found when the Chlorpromazine group was contrasted with the Phenobarbital group. The difference in the results between these two drugs is in favor of Chlorpromazine. No other significant differences were found in any other inter-group comparison.

4. *Critical flicker fusion (CFF).* The results of the critical flicker fusion (CFF) are indicated in table 6. As can be discerned, Phenobarbital and placebo patients achieved higher mean scores following completion of treatment. While the obtained mean differences of 1.76 and .79 are in the hypothecated direction, neither of these values is statistically significant. Reserpine and Chlorpromazine patients achieved lower mean scores following treatment. The Chlorpromazine mean difference of −.22 is, however, not significant. A significant

[3] At the one per cent level of confidence the probability is that the difference found could be duplicated in 99 out of 100 repetitions of this experiment. At the five per cent level of confidence, the probability of duplicating the obtained differences is 95 out of 100.

difference was found at the one per cent level when the Reserpine pre- and post-treatment CFF means were compared. It is to be noted that the lower Reserpine post-treatment score is in the opposite direction hypothecated in previous research studies with CFF.

In the inter-group comparisons, significant differences were found when Reserpine was compared with the placebo group and also when compared with Phenobarbital. No significant difference was found when Reserpine and Chlorpromazine were compared.

5. *Blood pressure (systolic).* Systolic and diastolic blood pressure readings were taken before and after treatment. Systolic blood pressure means, mean differences, standard deviations and t ratios are included in table 7 with similar data for diastolic blood pressure reported in table 8.

As can be seen from table 7 the groups were fairly well equated at the onset with respect to systolic blood pressures. Column 2 of this table reveals that the Phenobarbital, placebo, Reserpine and Chlorpromazine groups started with mean systolic blood pressure of 122.44, 121.30, 125.14, and 124.80, respectively, and terminated treatment with 115.69, 122.10, 115.45, 118.00, respectively. Reduction in systolic blood pressure readings was realized in three of the drug groups. The largest drop was in the Reserpine group with a mean difference of −10.31, as compared with a Chlorpromazine mean difference of −6.80 and Phenobarbital mean difference of −6.75. Systolic blood pressure remained relatively stable in the placebo group where a negligible increase was noted after treatment.

In comparing the placebo group with each of the three other groups, Reserpine alone yielded positive findings. The difference between the Reserpine and placebo groups is significant at the one per cent level. A trend towards significance was noted when Chlorpromazine was compared with placebo and when Phenobarbital was compared with placebo. No significant difference was found between Chlorpromazine and Reserpine with reference to changes in systolic blood pressure. Similar negative findings were reached in all other inter-group comparisons.

A significant difference at the five per cent level was found in the Chlorpromazine group when the pre- and post-treatment systolic means were compared. A trend towards significance is indicated when the Phenobarbital group is similarly compared.

TABLE 6.—Critical Flicker Fusion Means, Standard Deviations, Mean Differences and t Ratios

Drugs	N	Means		Mean Diff.	Standard Deviation	t Ratios
		Pre	Post			
Phenobarbital	10	43.52	45.28	1.76	4.11	1.28
Placebo	14	43.85	44.64	0.79	2.79	1.01
Reserpine	14	43.97	42.14	−1.83	1.88	3.52*
Chlorpromazine	16	43.70	43.48	−0.22	5.26	0.17

* Significant at the .01 level.

TABLE 7.—Systolic Blood Pressure Means, Standard Deviations, Mean Differences and t Ratios

Drugs	N	Means		Mean Diff.	Standard Deviations	t Ratios
		Pre	Post			
Phenobarbital	16	122.44	115.69	−6.75	13.44	1.95
Placebo	20	121.30	122.10	0.80	10.43	0.28
Reserpine	22	125.14	114.55	−10.31	11.09	4.26*
Chlorpromazine	25	124.80	118.00	−6.80	14.67	2.27†

* Significant at the .01 level.
† Significant at the .05 level.

TABLE 8.—Diastolic Blood Pressure Means, Standard Deviations, Mean Differences and t Ratios

Drugs	N	Means		Mean Diff.	Standard Deviations	t Ratios
		Pre	Post			
Phenobarbital	16	79.38	74.69	−4.69	12.43	1.46
Placebo	20	77.55	79.20	1.65	10.32	0.70
Reserpine	22	79.59	72.55	−7.04	12.93	2.50*
Chlorpromazine	25	82.80	79.00	−3.80	12.30	1.51

* Significant at the .05 level.

6. *Blood pressure (diastolic).* Reference to table 8 reveals decreased diastolic blood pressure readings with the three drugs—Reserpine, Phenobarbital and Chlorpromazine—as evidenced in the mean differences values of −7.04, −4.69 and −3.80, respectively. A negligible increase in diastolic blood pressure is indicated in the placebo group.

The Reserpine reduction in diastolic blood pressure alone proved significant at the one

TABLE 9.—WEIGHT MEANS, STANDARD DEVIATIONS, MEAN DIFFERENCES AND t RATIOS

Drugs	N	Means		Mean Diff.	Standard Deviations	t Ratios
		Pre	Post			
Phenobarbital	15	149.60	154.23	4.67	10.03	1.74
Placebo	19	158.89	159.16	0.27	6.40	0 05
Reserpine	20	156.10	162.50	6.40	4.73	5.87*
Chlorpromazine	24	167.67	169.42	1.75	8.66	0.97

* Significant at the .01 level.

per cent level. The decreased diastolic blood pressure observed in Chlorpromazine and Phenobarbital was not significant. It is apparent that the negligible mean difference in the placebo group likewise did not achieve any statistical significance.

Significant differences in the inter-group comparisons were found only when the placebo and Reserpine groups were contrasted. All other inter-group comparisons yielded negative results.

7. *Weight.* The pre- and post-treatment weight data are reported in table 9. Patients in each of the four groups achieved mean weight gains following completion of treatment. However, in the placebo group, the increased mean weight of .27 lb. is negligible, representing essentially no gain. The largest increase was found in the Reserpine group with a mean weight gain of 6.40 lb. compared with mean weight gains of 4.67 in the Phenobarbital group and 1.75 lb. in the Chlorpromazine group. The Reserpine mean weight difference is highly significant at above the one per cent level. The mean difference found in the other groups does not achieve statistical significance. A trend towards significance is seen with Phenobarbital.

Inter-group comparisons were undertaken to evaluate the relative effectiveness of the different drugs. In this analysis, it was determined that the Reserpine weight gain was of sufficient magnitude to yield positive results when compared with weight changes found in the placebo and Chlorpromazine groups. The difference between the Reserpine and placebo patients is significant at the one per cent level. The Reserpine and Chlorpromazine difference is significant at the five per cent level. Differences between all other drugs were not statistically significant.

8. *Summary of significant findings.* Tables 10 and 11 summarize the significant findings in all of the intra- and inter-group comparisons. The Reserpine group consistently showed significant findings on each measure employed in this study. Chlorpromazine significant differences were obtained on the manifest symptom inventory, the psychiatric rating scale, the

TABLE 10.—SUMMARY OF SIGNIFICANT WITHIN GROUP FINDINGS

	Manifest Symptom Inventory	Psychiatric Rating	Patient Self-Rating Scale	Weight	Blood Pressure		CFF
					Systolic	Diastolic	
Phenobarbital	.01	N.S.*	.05	N.S.*	N.S.*	N.S.*	N.S.*
Placebo	.05	.01	N.S.*	N.S.*	N.S.*	N.S.*	N.S.*
Reserpine	.01	.02	.01	.01	.01	.05	.01
Chlorpromazine	.01	.01	.01	N.S.*	.05	N.S.*	N.S.*

* Not significant at .01 or .05 level.

TABLE 11.—SUMMARY OF SIGNIFICANT BETWEEN GROUP FINDINGS

	Manifest Symptom Inventory	Psychiatric Rating	Patient Self-Rating Scale	Weight	Blood Pressure		CFF
					Systolic	Diastolic	
Placebo VS Phenobarbital	N.S.*	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.
Placebo VS Reserpine	N.S.	N.S.	N.S.	.01	.01	.05	.01
Placebo VS Chlorpromazine	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.
Phenobarbital VS Reserpine	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	.05
Phenobarbital VS Chlorpromazine	N.S.	.01	N.S.	N.S.	N.S.	N.S.	N.S.
Reserpine VS Chlorpromazine	N.S.	N.S.	N.S.	.05	N.S.	N.S.	N.S.

* Not significant at .01 or .05 level.

patients anxiety rating scale and in systolic blood pressure. Significant differences were observed on the Phenobarbital group when comparisons were made between pre- and post-treatment on the manifest symptom inventory and the patients anxiety rating scale. Placebo patients demonstrated significant differences when evaluated on the manifest symptom inventory and the psychiatric rating scale.

In the inter-group comparisons there was a significant difference in the psychiatric rating in favor of Chlorpromazine when patients on this drug were compared with Phenobarbital. When Reserpine and placebo patients were compared, significant differences were found in weight, systolic and diastolic blood pressure and the critical flicker fusion test. Significant weight differences in favor of Reserpine were indicated when Reserpine and Chlorpromazine were compared. A significant difference in favor of Reserpine was likewise found when CFF comparisons were made with Phenobarbital.

Summary and Conclusions

This investigation was undertaken to evaluate the relative effectiveness of Chlorpromazine, Reserpine, Phenobarbital and a placebo on symptomatic manifestations of anxiety. A total of 84 voluntary psychiatric admissions in a V.A. General Hospital completed a 30-day course of one of these four preparations Subjective, psychiatric, physiological and psychological measures were employed to evaluate changes before and after treatment. The findings of this investigation revealed:

1. Patients in each of the four groups reported a significant reduction in the number of manifest symptoms of anxiety after the 30-day treatment. When the drugs were compared with each other, no significant differences were found.

2. On an anxiety rating scale completed by each patient before and after treatment, significant differences in diminution of over-all anxiety were achieved in all the groups, except placebo. No significant differences were found when the groups were compared with each other.

3. When the patients were evaluated psychiatrically before and after treatment, significant improvement was evidenced in all groups except patients on Phenobarbital. When Chlorpromazine was compared with Phenobarbital, a significant difference was found in favor of Chlorpromazine. All other group comparisons yielded negative results.

4. The critical flicker fusion test was employed to evaluate levels of anxiety. Patients in the Reserpine group alone demonstrated significant changes in the critical flicker fusion score upon completion of treatment. It is to be noted that the Reserpine lower post-treatment CFF score was in the opposite direction to that hypothecated in previous research studies. These findings would suggest the desirability of further study. Several possibilities emerged from this investigation. While it has been formulated that "the anxious person being preoccupied with the internal state of affairs directs less attention to the external reality, flicker" (3), it may very well be that with certain levels of anxiety, the anxious person has need to hold on to reality longer. There may also be a physiological factor in Reserpine and possibly Chlorpromazine which independently effects the visual response to the CFF. (12)

5. The association of weight gain and reduction in anxiety is a common clinical observation. Significant weight gains were recorded only with patients in the Reserpine group. These patients differed significantly from patients on Phenobarbital and Chlorpromazine with respect to weight changes.

6. Reserpine patients were the only group to demonstrate significant reductions in systolic and diastolic blood pressure. On Chlorpromazine, a significant reduction was noted only in systolic blood pressure. However, in neither case did the lowered blood pressure produce any untoward side effect.

7. When Reserpine and placebo patients were compared, significant differences were found in weight, systolic and diastolic blood pressure, and on the critical flicker fusion test. A significant weight difference favoring Reserpine was indicated when Reserpine and Chlorpromazine were compared. A significant difference in favor of Reserpine was similarly found on the CFF test when this drug was compared with Phenobarbital.

One patient on Chlorpromazine developed hepatitis, and one patient on Phenobarbital became dizzy and hypotensive. No other un-

toward effect accompanied the utilization of any of the drugs. (10)

In evaluating the results of this study, consideration should be given to the limiting effects of the influence of hospitalization, the nature of the psychiatric patient population, the duration of the course of treatment and the dosages employed. The over-all results of this study indicate that each drug was efficacious in reducing symptomatic manifestations of anxiety. While isolated instances pointed to the superiority of Reserpine and Chlorpromazine, few significant differences were observed when the drugs were compared with each other. Previous research and clinical experience at this and other hospitals suggest that Chlorpromazine and Reserpine are far more effective with marked agitation and panic states than with the alleviation of the kind of overt manifestations of anxiety studied in this investigation. (4), (8)

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CONTROLLED STUDY ON CLINICAL USE OF RESERPINE IN PSYCHOTIC PATIENTS WITH SPECIAL COMMENTS ON SOURCES OF ERROR

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Introduction

A controlled study on the use of reserpine was carried out at the Pontiac State Hospital, Pontiac, Michigan. A total of 195 patients participated. One hundred and fifty-one patients received reserpine, and 44 patients received a placebo for a period of 4½ months. All patients were psychotic females ranging in age from 16 to 80 years of age. The patients for both reserpine and placebo were selected at random from the most disturbed patients on seven different wards. The characteristic behavior on the seven wards varied from a ward where patients were extremely deteriorated, exhibiting no apparent interest in their surroundings, requiring spoon-feeding, tearing off their clothing, soiling themselves with feces and urine, and often being combative or resistive, to a ward where patients exhibited few of the above features, except on occasions, these occasions being frequent enough to permit observation of any distinct changes which might occur during the course of the study.

The attendants kept a written record of the behavior of the patients in the study, beginning with their behavior prior to therapy. The notes on each patient were discussed at least weekly with the ward physician, who made daily rounds six days a week for the period of the study, observing the alleged behavioral changes.

The patients' behaviors were well known to the attendants since, with only rare exceptions, the patients had been in the hospital from 1 to 55 years. Likewise, with only rare exceptions, the patients had been on the same ward for a minimum of several months to many years prior to and during the study, as were all the head attendants involved in the study.

At the end of the study, a brief summary chart was made on each of the 195 patients, both before and after therapy. A description was given of the patient's eating and sleeping habits, soiling, cooperation, sociability, contact with and interest in the environment, emotional patterns, speech, interest in visiting relatives and friends both at home and in the hospital, general appearance, and of the attention required from hospital personnel, as well as observable physical effects of the drug and any miscellaneous comments.

Description of Scale Used for Evaluation of Drug

An attempt was made to categorize the patients for purposes of evaluation. The actual behavior of the patients, rather than the clinical diagnosis, was utilized. In order to be able to measure any improvement, only the most common and most evident features of behavior in the majority of patients were arbitrarily chosen to make up the categories to be used for comparison. A minority of the patients on the study did not exhibit all of the features to be so categorized. Hence, reasonable substitute features were utilized when necessary, or the improvement, if any, was based upon only the existing features.

The improvement to be described is construed to have occurred generally within the first two months of treatment and to have lasted the remainder of the 4½-month period of the study.

Scale

In extremely deteriorated patients, marked improvement consisted of essentially these changes in every patient in all five of the following categories: 1) Patients who for months to years showed little or no interest in their surroundings became interested in ward activities, often helping to mop the ward or wash dishes or gave some similar objective evidence of improvement. 2) Patients who tore off their clothing or refused to be dressed no longer manifested this behavior, most often helping to dress themselves. 3) Patients no longer soiled themselves with feces and urine.

4) Patients who required feeding by attendants now fed themselves. 5) Patients who formerly required frequent seclusion, hydrotherapy, electroshock, or sedatives (either one or all) no longer did so.

In extremely deteriorated patients, *moderate improvement* consisted of improvement in three or four of the above five categories, whereas *minimal improvement* consisted of improvement in one or two of the above five categories.

In patients who showed little or no deterioration *marked improvement* consisted of essentially these changes in every patient in all four of the following categories: 1) Patients who had previously shown no interest in visitors or in visiting at home expressed a desire for both and did well in this regard. 2) Patients who had seldom or never gone to occupational or recreational therapy, movies, church and similar hospital activities now did so regularly and got along well at these activities. 3) Hostile or combative patients became more tranquil, causing no difficulty and expressing little or no hostility, and causing no previous difficulties which were seen in their reactions to delusions or hallucinations. However, these delusions or hallucinations in most instances persisted if previously present. 4) Patients who formerly required frequent seclusion, hydrotherapy, electroshock, or sedatives (either one or all) no longer did so.

Moderate improvement in these patients who showed little or no deterioration consisted of improvement in two or three of the above categories, whereas *minimal improvement* consisted of improvement in only one of the above categories.

A number of patients from the least deteriorated halls have gone out on convalescent service or to family care homes at the completion of the study. These patients are being maintained on doses of reserpine similar to their final dosage in the hospital. It is the belief of the ward personnel that the number of patients leaving the hospital following reserpine therapy represents a greater percentage of total patients leaving than occurred previously over a similar period of time. However, the series is too small to be of statistical value in this regard.

The above description of the categories of behavior demonstrates only the two extremes of behavior: extreme deterioration and little or no deterioration. The proper criteria for evaluation were applied to all patients whose behavior fell between these extremes, which were, in general, the proper conbination of the aforementioned categories.

Method of Administration

The ward physician attempted to conceal from the patients as well as the ward attendants and nurses the presence of a placebo. The patient received only one of the two types of "pills" for the duration of the study with the exception of several cases to be discussed. The placebo was identical to the reserpine in every respect of appearance and taste and every other identifiable aspect. All medication was given orally only. The drugs were given daily in the morning with initial doses ranging from 3 to 6 milligrams. When the patient became drowsy throughout the day, the same dosage was continued for a week. If the drowsiness did not subside spontaneously after a week, the dose was decreased gradually till no drowsiness or only slight drowsiness occurred, the latter not interfering with any activities. In some instances drowsiness never occurred in patients on reserpine. The chief reason for decreasing the reserpine was not discussed with the ward attendants, and the patients who were on placebo, known only to the ward physician, were treated like the reserpine patients with dosage changes corresponding to those on reserpine.

In general, the maintenance dosage ranged between 2 to 6 milligrams, with decreases carried out gradually.

Side Effects

The usual side effects of transient hypotension, bradycardia, peripheral edema, and mild gastroenteritis were noted in a few but disappeared spontaneously—or, as in the case of the first two mentioned, persisted in mild form. In one patient hypotension forced cessation of therapy. The onset of a Parkinson-like syndrome was noted in two cases maintained on the higher dosages and was controlled by decreasing the dosage or by stopping the drug for several days and re-starting on a lower dosage. No irreversible side effects were noted. (2, 4)

Results

Of the 151 patients on reserpine, the distribution by diagnosis was 64 paranoid schizophrenics, 25 hebephrenic schizophrenics, 25 catatonic schizophrenics, 12 manic-depressive psychosis, 8 mental deficiency with psychotic reactions, and 17 distributed among several other groups. The distribution of the 44 patients on placebo followed a similar diagnostic pattern by percentages.

Of the 151 patients on reserpine during the study of 4½ months, 23.2% (35 patients) showed *marked improvement*, 37% (56 patients) showed *moderate improvement*, 27.2% (41 patients) showed *slight improvement*, 11.9% (18 patients) showed *no change*, and 0.6% (1 patient) appeared to do *worse* while on reserpine, her hypochondriacal complaints increasing.

Of the 44 controls on placebo, only 4.5% (2 patients) showed *marked improvement*, 4.5% (2 patients) showed *moderate improvement* 29.5% (13 patients) showed *slight improvement*, and 61.3% (27 patients) appeared to be the *same*.

Hence, a significantly higher percentage of the patients on reserpine showed over-all improvement compared to patients on placebo.

Case Histories

Case 1: E. A. is a 50-year-old white female schizophrenic, paranoid type, with many catatonic features. She has been in the hospital for 8 years. Prior to the onset of her illness, she had been an instructor in English at a university. For the past several years the patient was very untidy, standing for hours against the walls, drooling saliva, and soiling herself with feces and urine. She had to be spoon-fed at every meal. She laughed out loud frequently for no apparent reason and often attacked another patient or attendant without warning or provocation. Approximately one week following onset of reserpine therapy, the patient fed herself, attended chapel and recreational therapy. On a visit at home she carried on a relevant conversation with her mother and inquired about relatives. These activities had not been carried out for years. She improved steadily. She became tidy and showed no evidence of the impulsive behavior she had displayed constantly throughout the years.

Because of an error in orders on medication, the patient failed to receive her medication for several weeks, and she gradually reverted to her former behavior. Following the repeat onset of reserpine therapy, the above benefits were again noted after a few weeks. After a month of such benefit, the patient's mother insisted on stopping the medication, which was against her religious beliefs, and because she believed the medication was physically harmful. The mother insisted that her prayers were responsible for the benefit. Reserpine was stopped, but a placebo was started immediately to determine what benefits would remain. The patient's behavior gradually reverted to what it had been during the years prior to therapy. Because of the mother's attitude, reserpine was not restarted.

Case 2: J. M. was a 34-year-old paranoid schizophrenic who had been in the hospital 4 years. Her general attitude was one of hostility, sarcasm, and refusal to cooperate. She expressed delusions of having discovered a cancer cure and had a morbid fear of "germs" which prevented her from touching many objects, often including her food. Frequently, she was noisy and overactive, tore off her clothing, and refused to work. She often got into fights with other patients and required sedation and seclusion. She did poorly on visits.

Several weeks following onset of reserpine therapy, the patient became pleasant and cooperative. She took an interest in her own appearance, in hospital activities, and began to work. She was granted permission to go about the hospital grounds without supervision.

She maintained her improvement for several months and at the end of the study, left the hospital on convalescent service.

This patient represents a case of *marked improvement*.

Comments

Possibly the greatest source of potential error in a study of this nature lies in the attitude of the attendants and hospital personnel who feel that their ability in caring for patients is being tested in conjunction with one of the highly-publicized new drugs. The lay press has prematurely accepted the drugs as being proved of definite value to the health of mental patients, instead of being still in the experimental stage where they rightfully belong until years of further clinical and laboratory research have clarified their proper value. Further possible error in evaluation may be hidden in the fact that patients show a favorable response to the increased attention paid to them by hospital personnel during all phases of the clinical trial with any of the drugs. This error in evaluation tends to be borne out by the fact that in this study, over one-third of all patients on placeboes showed some degree of "improvement".

Another possible source of error even in a most carefully conducted study with placebo medication lies in the fact that in many instances, the effects on the patients of the real medication (in this case, reserpine), such as the initial drowsiness, are readily observable by the attendants permitting distinction be-

tween placebo and the real drug. Attempts to utilize barbiturates identical in appearance to the real drug as the placebo in order to overcome this flaw cannot be completely successful again because of other points of easy distinction between these drugs and reserpine. (5)

Despite these possible sources of error, the uniform enthusiasm shown by hospital personnel concerning the beneficial effects of the reserpine in the over-all study would indicate that actual benefit from the drug has occurred.

The permanence of such improvement is still a question to be answered, but other studies report benefits still in continuance more than one-half year after onset of drug therapy.

Another significant observation is noted in that the greatest amount of improvement occurred in the more disturbed patients, with less observable improvement in most of the relatively comfortable patients. This fact does not serve to detract from the relative value of the drug since the more disturbed patients became more amenable to hospital care, lessening the burden on hospital personnel. The drug may also, as indicated by other studies, mark the onset of improvement sufficient to enable larger numbers of patients to return to the community. In either case, it is this writer's belief that there will be an increasing need for psychotherapy to take advantage of and to further the improvement. (3)

Isolated instances of "remarkable improvement" on the drugs must be viewed with suspicion and compared to former rates of "spontaneous recovery". Yet, several such instances occurred and are mentioned because they tend to corroborate the statistical evidence in favor of the drug.

Elimination of Other Forms of Sedation and Seclusion

It is notable that on all seven wards involved in this study, the necessity for sedatives was entirely eliminated in all the patients who had been started on reserpine This fact remained true long after the sedative effects of reserpine were absent in the patients receiving that drug. One attendant, who had been on the most disturbed hall for many years, stated that the monthly use of large amounts of paraldehyde and barbiturates and frequent seclusion utilized during previous years had been virtually eliminated. The only exceptions occurred in patients on placebo.

Observation on the Physiology of Mental Illness

It is not within the scope of this paper to speculate on the psychophysiologic aspects upon the central nervous system of reserpine or chlorpromazine, the two most widely used of the new drugs for mental patients. It is most interesting and most valuable for further research to note that in the action of these drugs lies further evidence to indicate that emotional illness is not separable into "purely psychological" and "purely organic" components. (6) This is attested by the fact that a drug administered ostensibly for its "physiologic" effects is capable of altering significantly a "mental illness". (1) We must therefore conclude that every psychosis and, more likely indeed, every mental illness is truly a disease of the entire organism. Like a malformed and barren tree meant to bear fruit, though the roots of the disease may lie in an infertile soil of abnormal interpersonal relationships, it is the entire plant—trunk, branches, leaves, and fruit—which is sick and requires investigation and treatment.

Summary

A controlled study was conducted on 195 patients, 151 of whom were on reserpine and 44 of whom were on a placebo for 4½ months. Of the patients on reserpine 23.2% showed marked improvement, 37% showed moderate improvement, and 27.2% showed slight improvement. Of the 44 controls on placebo only 4.5% showed marked improvement, 4.5% showed moderate improvement, and 29.5% showed slight improvement.

Observations concerning possible errors in a clinical study of this nature are described. Hence the need for further verification of the clinical value of reserpine in mental disease is required.

If ultimately proved to be effective, even in a moderate percentage of cases, its potential therapeutic value is immense.

The use of such a drug to further investigate mental mechanisms may also be significant.

Thanks are extended to the many nurses and attendants who aided in this study, with special thanks

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THE PHYSIOLOGY OF TREMOR AND NYSTAGMUS

A Kybernetic Analysis

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The physiology of tremor is still unsolved, in spite of many theories that have been put forward. Tremor was defined by Kinnier Wilson in 1928 (15) as "a regular, rhythmical, alternating contraction of a muscular group or groups and their antagonists," and elsewhere as "a succession of similar movements at equal intervals." Its rate may be from four to eight double movements a second, most often about six a second (the same rate as the scratch-reflex of a spinal dog); it does not (as is sometimes stated) "vary from four to eight a second." On the contrary it stays remarkably constant in any given individual. A fine tremor has a range of movement less than one-eighth of an inch; a coarse tremor may shake by as much as nearly an inch. It affects mainly the small muscles of the fingers and hands rather than the large muscles of the limbs and trunk (these being the site of the nearly allied thermal shivering and trembling in fear). Two movements especially are common: the "pill rolling" movement of the thumb and forefinger, and the steady rotational trembling of the wrist, which is really a movement at the lower elbow-joint.

Tremor is an involuntary movement and, unlike shivering, is independent of cortical control. The rhythmic oscillations add no component to the electrical rhythm of the brain, proving conclusively that it is not a rhythmic discharge of nerve cells of the cortex, and equally conclusively that the pyramidal tracts cannot be the pathway.

Not even electrodes implanted within the substance of the corpus striatum have detected any neural rhythm synchronous with the rhythmic movements of the muscles. Four patients so investigated yielded records which were indistinguishable from normal controls. The records of six others presented various unusual wave-patterns, but "it was not possible to identify a consistent relationship between the type of electro-striatogram derived from a given subject and the clinical features of Parkinsonism exhibited by him. When electro-myograms corresponding to tremor activity were recorded, their frequencies (4–5 per second) did not correspond to those of the concomitantly recorded electro-striatograms and electro-encephalograms" (9).

Unlike the pseudo-purposive movements of chorea, tremor is completely purposeless, a further argument against a higher-cortical origin. At the lower end, the spinal cord may be dismissed because of the fully integrated reciprocal innervation which is invariably present, and which would be interfered with by a lesion among the motor cells of the cord. Tremor does not appear in muscular activity which is purely reflex, that is, coordinated at the spinal level (13).

The neural substrate of tremor, therefore, must lie between the cortex and the cord; as the pyramidal tract has no relay between these two levels, the choice is narrowed down to one or other of the extrapyramidal systems. This does not imply, however, that the pyramidal tract is not concerned in tremor, but only that the disease process must affect the extrapyramidal nerve centers other than those in the cortex and the cord. It is probable that tremor is dependent upon an intact pyramidal pathway; for tremor, like athetosis, is abolished by a capsular hemiplegia. In the case of tremor, however, it is the blocking of the pyramidal fibers, not the suppressor fibers, in the internal capsule which abolishes the movement. This is confirmed by surgical treatment of the tracts in the spinal cord: cutting the extrapyramidal pathway relieves athetosis; cutting the pyramidal tract reduces tremor (2). At the other end, destruction of Area 6 (extrapyramidal) relieves athetosis; destruction of Area 4 (pyramidal) abolishes tremor (3).

The main difficulty that has beset so many attempts at a physiological or neurological analysis of tremor is the inconstancy of the basic clinical facts upon which a reasoned argument should rest. Neither the site, the

range, nor the type of tremor affords any help. The anatomical site varies in the same patient from minute to minute; it will shift suddenly or wander from one wrist to the other. "This variability or fluidity of distribution is suggestive not of a fixed structural disorder so much as of a morbid process" (15). In the rare cases of hemi-Parkinsonism after encephalitis, the tremor may overflow into the opposite, sound limb.

The clinical distinction between fine and coarse tremor cannot be of help as a starting point, for the tremor may vary from fine to coarse, either regularly every two or three seconds like a slow-running engine with a superimposed secondary vibration, or irregularly (in post-encephalitics). Even the cardinal classification into tremor-at-rest (static, postural, the typical Parkinson tremor) and tremor-on-movement (intention, voluntary, cerebellar tremor so diagnostic of disseminate sclerosis) has been shown to be valueless. In paralysis agitans "a highly characteristic feature of the tremor in about one-half of the cases is that it continues during repose, and is temporarily arrested by the execution of volitional movement. In the other half of the cases, however, the tremor appears or is increased on voluntary exertion, and tends to be less during repose" (14).

With so many parameters unreliable, the most helpful may be found in the inverse relation between tremor and rigidity which is almost the only feature that really is constant. In patients, when the rigidity is marked, the tremor is slight; when the tremor is early or extensive, the rigidity is less; and in the process of cure the tremor increases as the rigidity lessens. In muscles, tremor affects the small muscles; rigidity, the large muscles. In diseases, tremor is prominent and rigidity secondary in paralysis agitans; rigidity is prominent and tremor secondary in post-encephalitis.

The essential different-ness, however, of rigidity and tremor is brought out by the observation that infiltrating the rigid muscles of paralysis agitans with a local anesthetic abolishes the rigidity but leaves the tremor unimpaired. "Tremor is completely unaffected by rendering the tremulous muscles flaccid by this means. Therefore, tremor is a phenomenon essentially different in its origin and nature from rigidity, and the widely held view that 'tremor is rigidity spread out thin' must be regarded as wholly untenable" (12).

The following argument seems to be reasonable. Rigidity is due to blocking of the suppressor system; as the suppressor system recovers, so the rigidity lessens, and the tremor comes on. Tremor must therefore be the effect of augmentor blocking, for were the augmentor system normal, recovery of the suppressor system would lead the patient back to untremulous health. This sequence, it will be observed, is structurally identical with a possible etiology of athetosis which comes into being during the lessening of hemiplegic spasticity.

The new science of kybernetics deals, among other things, with oscillations as such, regardless of the matter that is oscillating; it is a science of form, not of substance. The kybernetic approach concerns itself first with the structure of the oscillations and divides them into stable, decreasing, or increasing. A stable oscillation is the pill-rolling of Parkinson and the gross tremor of shivering, which are maintained at a steady level over a certain interval of time. A decreasing or damped oscillation occurs as the tremor fades in one place to wander elsewhere, and in the regularly waxing and waning due to a superimposed period. It is seen also in the sign of "excessive rebound", a diagnostically valuable test of cerebellar disease which may be present when other components of the syndrome are absent. "If the arms be horizontally extended by the patient, and the observer smartly strikes them downwards somewhere in the region of the hand, the arm on the normal side is quickly brought to rest in its original position with a minimum of recoil. On the side of the lesion, however, the hand and arm bounce freely and may swing two or three times before being brought to rest" (14).

It is the increasing type of tremor, however, which is of such interest, and this is often seen in cerebellar disease: if a patient is tested by asking him to make some voluntary movement, the tremor steadily increases in range and severity as the goal is approached. If for instance he is asked to touch his nose with the tip of his finger, "the tremor may appear as two or three jerky movements of the finger just as the goal is attained; or the finger reaches the nose without any abnormal movement and

then oscillates, so that it slips away from the nose or depresses it several times before coming to rest" (14).

Kybernetics has shown that oscillations of every type are invariably and necessarily subject to negative refection or feed-back, that is to a correcting force which tends to restore the oscillating body to its zero position. If, as in the case of a pendulum, the effect of gravity as the restoring force is proportional to the displacement, a simple harmonic motion or true sinusoidal curve results. Another much-quoted example of negative feed-back is the radar mechanism on a goal-seeking searchlight, which reduces to zero the error or distance-from-goal, that is, the angular displacement between the searchlight and the object sought.

As a physiological example, consider the normal mechanics of muscular refection, as in the case of a cricketer catching a ball. The input or proximate source of power is the high-energy phosphate bonds passing from creatine to adenosine and myosin within the substance of the muscles; the output is the movement of body and limbs which aims at reducing to zero the distance between the hand and the approaching ball. The feed-backs are the visual messages from the eyes, muscular sensations from the limbs, and finally the impact of the ball into the hand which instantly throws out of action that particular circuit of operations, its goal having been achieved. The feed-backs serve to control moment by moment the amount of glycogen, on the input side of the circuit, which is to be converted into muscular activity.

Suppose a time-lag were introduced into the refectory circuit, for instance by local damage to a small group of cells, which caused the ascending neural impulse to travel through other cells, a longer way round—longer both in distance and time. The negative signal would arrive, the brake would be put on, a fraction of a second too late, and the muscle would overshoot its mark; feed-back in the opposite direction (still negative) now comes into play to reduce the error or distance-from-goal, and the movement is thrown into reverse to correct the error. If the damaged cells occupy a path common to both halves of the movement, the same time-lag will occur, again an overshooting of the goal and again a reversal of movement: hence the regular oscillation or stable tremor, explained fully by the delay in feed-back due to a small obstruction in the circuit.

In oscillations of all types, whether regular, waning, or waxing, negative refection is mathematically the rule. For increasing oscillations such as tremor-on-movement, it can be shown that the cause is a negative feed-back that has developed a time-lag so large that it is unable to catch up with the steadily enlarging excursions. The difference therefore between tremor-at-rest or stable oscillation and tremor-on-movement or unstable (increasing) oscillation is one of degree only, namely the amount of time-lag in the feed-back, the extent of neural damage in the refectory circuit. It can offer no diagnostic criterion between one site or another of neural damage, and both forms of tremor can appear in one disease (as they do in Parkinson) according only to whether the damage is fine or gross. It may be suggested, however, that disease in the brain stem or basal ganglia, lying on the direct (but extrapyramidal) pathway between cortex and cord, will cause less delay to refection than disease in the cerebellum which involves longer axones and two or three extra synapses. This accords with the fact that stable tremor is associated with disease of the basal ganglia, unstable tremor with disease of the cerebellum. It further explains why the comparatively gross sign of excessive rebound (a decreasing oscillation stabilizing to zero) may appear in cerebellar disease before the earliest intention tremor (increasing or unstable oscillation).

Muscular tremors may be classified according to the stability of their oscillations (waxing, waning, or constant) and according to the pattern of the individual wave, whether it is symmetric or asymmetric. The tremors of neurological disease are mostly symmetric (in form if not in size), but asymmetric tremors are known. In cerebellar disease "if the arms be horizontally extended, they may show a tendency to droop, which is corrected by a series of jerks which thus give the form of a tremor" (14).

The commonest asymmetric tremor is nystagmus in the eyes. This is shown by everyone who looks out of a window of a slowly moving train. The eyes fix on an object in the foreground, follow it a second till it has passed

out of sight, move rapidly forward to look at another object, and so on; the slow motion of the eyes is toward the rear of the train, the rapid "compensatory jerk" is towards the engine. Nystagmus is common in disease of the cerebellum and in coal-miners who have worked for long years in the dark against the black coal-face and have damaged their powers of fixation. The tremor is asymmetric, a slow swivelling of the eyes to one side as though looking upon a rotating world, a rapid jerk under the control of vision to correct the error.

Nystagmus is so frequent, indeed, among miners that it is classed as an occupational disease. "The origin of coal-miners' nystagmus has never been satisfactorily explained. Some hold that it is primarily psychoneurotic, whereas others suggest that the chief cause is using the eye at levels of illumination below the threshold of perception by the cones, with the result that . . . the macula is in effect blind and the eye has only peripheral vision at these low intensities of light" (1).

The cones of the retina are the highly sensitive elements clustered at the fixation-point, leaving the outlying areas tenanted mainly by the retinal rods used in night vision. The sensitivity in question, however, is that of pattern-perception, not light-perception. Nystagmus is a disease of the cortex, not of the retina, hence its psychical complications. The variety known as vestibular nystagmus, however, is subcortical, for both phases (quick and slow) "remain intact after extirpation of the cerebral hemisphere or section of the brain down to the level of the oculo-motor nuclei" (7). Browne (1) has placed on record that animals kept continuously in the dark (kittens, puppies, infant apes) develop nystagmoid oscillations of the eyes after some weeks, which disappear after a few days in the light. He concludes that "coalminers' nystagmus may well be a partial disuse atrophy of the visual function from lack of light."

The prime cause of an asymmetric oscillation is the replacement of an intrinsic by an extrinsic feed-back or restraint from outside, that is, extrinsic to the normal feed-back circuit, not necessarily external to the body. The extrinsic refection, being abnormal, comes into play only after a gross departure from normality which is the goal, that is, its threshold is higher than the intrinsic feed-back.

In coal-miners' nystagmus, the intrinsic or normal feed-back which has failed springs from macular acuity which enables the healthy person to fix the eyes on a line of print. Disuse-atrophy of the fixation-reflexes, caused by constant near-staring at a featureless blank, renders the miner's eye insensitive to deviation; it has lost its response to error or distance-from-goal. When the eye has deviated, the necessary warning of error, that is, negative feed-back, comes from the outlying part of the retina which in the healthy is less sensitive, but in the miner more sensitive than the central spot; a new and unwonted feed-back has replaced the old.

The balance of the eye muscles is delicate, and minimal damage alone is needed to upset their refection. The blockage of a feed-back circuit in nystagmus may be so minute that only those cells are involved that come into action in one position of the muscles, usually the position they hold when the miner is at work. Nystagmus does not appear in such cases unless the head and eyes are adjusted to this particular fault, and it disappears on normal looking ahead.

In both nystagmus and the drooping arm of cerebellar disease, the slow movement (which may gain in speed) is a failure of intrinsic or normal feed-back, due to neural damage somewhere on the refection-circuit; the quick jerk in the opposite direction, which is dead-beat and shows no rebound, is mediated by extrinsic feed-back often from higher, cortical centers, unaffected by disease, that come into play to restore things to normal after each failure of the lower centers.

In terms of physiological thresholds, the fine control exercised by the lower centers with low thresholds is replaced by a coarser mechanism through the higher centers which, taking on an unaccustomed duty, have high thresholds. In miners' nystagmus, the sensitivity of the fixation-reflex from the central part of the retina is so reduced that it falls below that of the outlying areas, which have to undertake fixation duties to which they and their neural connections are ill adapted. The tabetic gait is an asymmetric oscillation of exactly the same kybernetic structure.

The influence of retinal threshold on the induction of oscillation in a normally stable system is exemplified in the movements of the

pupil of the eye. The sensitivity of the retina is highest (its threshold is lowest) at the center, least at the periphery; this obtains not only for pattern-vision but also for the reflex which closes down the pupil in a bright light. A small pencil of light elicits the maximal pupillomotor effect when directed to the sensitive central point or fovea of the retina, and considerably smaller effect when impinging on the periphery (6). This is in spite of the fact that the outer areas, used for night work, have the higher sensitivity for faint lights (which is the craft-secret of the good night watchman). The pupil responds to central illumination by contraction from one stable position to another; it is liable to exhibit prolonged oscillations (up to 200 cycles) when the beam of the slit-lamp is thrown into the margin of the eye where the retinal threshold for this reflex is much higher (4).

The primary lesion or constellation of lesions which constitutes the disease in any instance of tremor lies, it has been reasoned, on the augmentor system. There are several independent lines of evidence which point in the same direction. The augmentor system sustains tonic posture and therefore never goes off duty except during sleep; whereas the suppressor system, called up as a preparation for some sort of phasic movement, either voluntary or reflex, comes into action only as occasion demands. The sustained duration of tremor-at-rest, coupled with its ceasing during sleep, make it probable that it is due to augmentor deficit. A form of nystagmus is related to disease of the vestibular organs, and these have unequivocal affiliations with the augmentor side. The rapidity of the compensatory jerk, when of cortical origin, makes it unlikely that there is any damage to the suppressor circuit which is necessary for all cortical movement.

The hypothalamic nuclei are involved in the postural pathways, but only remotely, and the details are obscure. In general, the augmentor circuit is related to the posterior or sympathetic end of the hypothalamus (witness the resemblance between decerebrate rigidity and the position of rage), while the suppressor circuit is related to the anterior, parasympathetic end. The species of tremor-at-rest known as shivering is a principal defence against external cold, which defence is mobilized and coordinated by the sympathetic in the posterior hypothalamus. Some sufferers from Parkinson's tremor seem to be almost immune from the effects of cold, as they are constantly generating surplus heat in their muscles, and therefore enjoy basking out of doors in the winter sunlight. The mechanism of shivering could be postulated as the long-circuiting through the posterior hypothalamus of feed-back impulses on the augmentor side, thereby introducing the necessary time-lag to bring about a stable oscillation. Shivering, it is well known, is under the control of the cortex and may be inhibited by an act of will; at the same time, there is a cessation of the feeling of cold. This has been used as an argument in support of the peripheral theory of emotions: the sensation of cold is the effect or result of shivering, not its cause.

The trembling of fear, which does not serve any useful function, might be due to the access of sympathetic anxiety invading the posterior hypothalamus and operating the same mechanism to a rogue purpose. This explanation is certainly valid for Parkinson's tremor, and Oliver (10) cites several cases of tremor directly attributable to situations of anxiety. The typical, unmistakable agitations came on, in one case, within a few hours of the patient's losing his job; in others, immediately after an explosion, immediately after an air-raid, immediately on hearing his son had been killed, immediately after an accident. A case is on record of a tremor dating from an anxiety-situation in childhood having been cured by analysis which dispelled the anxiety. It is evident that the agitations of pallidal disease are closely allied to the trembling of hypothalamic origin, and the two nuclei concerned are themselves closely connected. Unlike shivering, emotional trembling cannot be controlled by the cortex.

The cerebellum has recently been analyzed into its three phylogenetic components, which are the archi-cerebellum related only to the vestibular nuclei, the paleo-cerebellum related to postural movements and the paleo-somatic system, the neo-cerebellum related to voluntary movement and the neo-somatic pyramidal pathway. Stimulation of the paleo-cerebellum causes instant abolition of decerebrate rigidity (11), which alines it at once with the suppressor circuits. As would be ex-

pected, ablation leaves an animal in extreme rigidity, from which it recovers after a few months to perform voluntary movements without any trace of tremor (5). Stimulation of the neo-cerebellum, on the other hand, enhances the excitability of the motor area of the cortex, revealing its augmentor bias; ablation, accordingly, leaves conspicuous hypotonia in which muscular feed-back is grossly defective. "In the chimpanzee a neocerebellar lesion is followed by hypotonia. The animals are so loose-jointed on the affected side that they smite their own faces when a resisting arm is suddenly released. . . . In grasping at an object the monkey frequently overshoots the mark, and in carrying the food towards the mouth he may miss his face altogether. . . . The extremities lag behind the normal extremities in the execution of rhythmic act" (8). The tremor which is so characteristic of cerebellar disease in humans is referable therefore to lesions of the new and augmentor part of this organ, and not to its suppressor functions.

Summary

It is an axiom of kybernetics that all oscillations must be controlled by negative refection or feed-back. Certain physiological oscillations are considered—tremor, nystagmus, shivering, trembling—and the nature of the refectory mechanism examined. The oscillation can be explained in all cases as a time-lag introduced into the feed-back circuit of an otherwise stable system: in tremor, in the augmentor or facilitatory system which maintains muscle-tonus; in nystagmus, as a result of lowered retinal sensitivity; in shivering, to a long-circuiting through the posterior hypothalamus (the sympathetic headquarters) as the physiological reaction to cold; in trembling, to a similar long-circuiting owing to the disturbing effects of anxiety or fear.

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AN ANALYSIS OF THE RELATIONSHIP BETWEEN PSYCHOLOGICAL PATTERNS AND OUTCOME IN PULMONARY TUBERCULOSIS

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I. Introduction

Since the beginning of the century, there has appeared an ever-increasing number of articles in medical, social service and psychiatric journals concerned with the relevance of personality characteristics for the onset and outcome of pulmonary tuberculosis. Most of these publications are based upon the impressionistic observation of medical personnel: the "findings" are vague and often contradictory. The few studies which are based upon more systematic observation are limited in their usefulness by one or more of the following features: inadequate sample size; inadequate specification of sample characteristics; lack of comparative data for control or comparison groups; limited scope and depth of measurements of personality variables; inadequate techniques of analysis.

The present study is concerned with the relationship between psychological characteristics and outcome in pulmonary tuberculosis. Specifically, it entails the assessment of differential performance on a series of projective instruments by the following groups: a) patients diagnosed as chronic tuberculosis with unfavorable prognosis; b) individuals who have achieved an arrest of the disease with favorable prognosis for maintaining arrest. No similar study offering systematic comparative data for these two groups exists in the literature. Most of the studies are comparisons of unselected TB patients with healthy groups, or simple descriptions of TB patients without reference to any comparison group. There is one recent research which is comparable in some degree to the current investigation (21). The criterion groups in this study are "recovering" and "declining" tuberculosis patients (N = 13 in each group).

Rorschach performances constituted the sole measuring instrument, and these are evaluated singly for mean differences between the groups. Of twelve reported significance tests, five scores were found to significantly distinguish the recovering and declining patients. Briefly, the fruitfulness of the Ellis and Brown research is limited by the small number of cases, the restriction of the sample to females, the reliance on a single measurement technique, and the atomistic treatment of data.

II. Review of the Literature

A. Conceptual approaches

There have been many orientations to the conceptualization of the relationship between tuberculosis and personality structure. The earliest view was that of a direct effect upon personality by the toxins of the tuberculosis bacillus. Here one may find discussions of the spes phthisica or extreme euphoria supposed to be characteristic of the patients (51, 54). The majority of the reports in the more recent literature fail to substantiate these observations. Euphoria is rarely found. Further, when present, it is now appraised as a compensatory reaction to the psychological impact of the disease (59, 66, 70).

Another approach to this problem has emphasized situational factors and the essentially *reactive* character of personality features observed in patients (27, 30). There are two propositions generally advanced by observers sharing this viewpoint: 1) There is no definable relationship between specific personality characteristics and the onset of tuberculosis. Psychological patterns found in tuberculous patients have a range of variation comparable to that in non-tuberculous populations. 2) Special emphasis is to be placed upon the situational factors of the illness with its attendant alteration of the previous psychosocial adjustment, and the cognitive aspects of the patient's reaction to this altered life situation. The type of reaction may have a relationship to the *outcome* for particular cases. However, to quote one exponent of this approach, "the *individualistic* character of these personality reactions does not encourage one to expect valid *general* formulations for the direct correlation of personality traits with tuberculous infection." (p. 22, 30).

A relatively small number of writers have advanced a "psychosomatic" formulation of the problem. Stated briefly, it is posited that psychological stress may lead to physiological changes which predispose the individual to tubercular infection and is also effective in prolonging the illness. The mediating mechanism for this predisposition is generally referred to the autonomic nervous system. The outcome is said to be influenced not only by the intensity of the predisposing psychological factors, but also by any "secondary gain" the patient receives from the illness (19, 34, 71). It is not logically essential to this viewpoint to posit *specific* psychological characteristics of the stress situation.

Another point of view places emphasis upon the characteristic modes of coping with reality in relation to differential outcome (3, 8, 10, 11, 24, 71). Again, specific psychological conflict areas are not necessarily postulated as referring to all chronic patients. Significance is assigned to the adequacy of the pre-illness adaptive capacity which determines the individual's reaction to his disease, and is thus a factor in outcome.

B. Studies employing uniform measuring instruments

1. Projective techniques. Four studies have been reported in which psychological measurements have been based upon projective methods in the tuberculosis population. All four offer Rorschach data. Lindner (40) administered the Rorschach test to 56 veterans with arrested tuberculosis. The age range of this group of males was from 21–43, with the mean at 26 years. She compared her findings with the norms given by Beck (2) and Rapaport (56) and found no significant differences. However, both of these norms have increasingly come to be regarded as non-representative and inadequate for use as norms for adjustment. Therefore, one could not conclude from such comparisons that the arrested tuberculosis group does not differ from the normal. The investigator then applied the neurotic signs developed by Miale and Erickson (46) and found that eight of the nine signs occurred as frequently in the arrested sample as in the neurotic standardization group. The one sign which did *not* occur with comparable frequency in the veterans was rejection of blots. Further, the arrested group actually scored higher on two of the signs than the neurotics, namely, percentage of form responses over 50 per cent (assumed to be indicative of rigidity) and production of no, or only one, form-color response.

Further remarks on the comparability of Lindner's data to the data of the current research will be made when the results are discussed. However, it might be noted that her group has a lower mean chronological age. Lindner offers the following description of her sample, although she does not refer her interpretations to specific findings. She states that there is no evidence for a "typical" personality pattern, but goes on to say that the group is characterized by passive and dependent features, lack of sensitivity to others, dulled affect, and a dependence upon strong stimulation for the evocation of responses.

Singeisen presents Rorschach data obtained from 50 chronic tuberculosis cases and has compared them with 40 chronic cardiac cases (65). In both samples, there were equal numbers of males and females; the age range is given as 20–60. All cases were described as "seriously" ill; all had been ill at least one year. The patients were from the working and peasant classes of Switzerland. His data are reported in some detail. Although statistical evaluation is not given, the differences found with respect to a number of the Rorschach factors are worthy of note. He found a distinct trend toward extratensiveness in the chronic group. Twenty-six of the 50 TB patients had definite extratensive experience balance (predominance of color over movement responses); 11 more cases, though somewhat ambi-equal, tended toward a greater color dominance. In contrast, the cardiac group of 40 had only 12 cases with color predominance. Thirty of the 50 TB cases produced more color-form and primary color responses than form-color percepts, in comparison to 17 in the cardiac group of 40. Singeisen interprets the Rorschach findings for the TB group as follows: They are characterized by intense affect of a labile, nonadaptive type. They have an active rapport with their environment which, however, is disturbed by its egocentric and undisciplined features. High impulsivity was noted, together with a tendency toward critical, querulous attitudes towards other persons.

Singeisen links these comments to specific test factors, thus making possible the comparison and evaluation of his interpretations with those to be offered in the present investigation. However, it should be noted that he reports his data only in atomistic form, i.e., no analysis is performed which demonstrates how many in his sample actually manifested the several items simultaneously. The interpretation is based upon the assumption that the *pattern* of responses applies to a sufficient number of individuals in the group.

It ought to be noted that Singeisen's population is Swiss and includes members of the peasant class. The comparability of his findings with either Lindner's (40) or those of the current study is thus limited by these cultural differences. Further, we do not know what method of scoring was used in the Singeisen report although it may be a reasonable assumption that he conformed closely to that set forth by Rorschach (58). With these limitations in mind, perhaps the only comparison which can be made is the apparent higher sum of color responses in the chronic group as contrasted to the arrested group. It would also seem that the chronic group showed a more extratensive experience balance than the arrested group although from the averages presented by Lindner the arrested group would also seem to be somewhat extratensive. Such comparisons are limited in their validity by the inadequate and unequivalent methods of reportage in both studies.

Metzer (45) also noted the extratensive trend in chronic patients. Basing his observation on Rorschach findings, he reports: "In a great majority of patients mental changes can be detected in the region of affects. The premorbid personality is changed by the chronic tuberculosis in the direction of increased extratensivity." He further states that in chronic patients a cardinal characteristic is the disturbance of balance between introversive and extratensive tendencies.

Ellis and Brown (21) offer Rorschach data for 26 female tuberculosis patients; 13 of the group are described as "recovering", while 13 are said to be "declining". These two samples are controlled for age, intelligence, and duration of illness. Like Lindner, they used Beck's scoring system and report only means and sigmas for the various scoring categories. These are the salient findings: the number of responses and the Z-scores are both higher in the recovering groups (at the .01 level). The number of M, the sum of color, the number of different content categories used, and the number of popular responses are all higher in the recovering group. (These scores are significant at the 5 per cent level.)

The authors conclude: "Declining tuberculosis patients differ from recovering patients by significantly lower productivity and creativity, less emotional contact with the environment, constricted interests and organizational activity, less conventionality of thinking, and (greater) rejection of stimulus material as these psychological processes are measured by the Rorschach test." They also report they tested the following scores and found no significant mean differences: W%, D%, Dd%, Y (although this was higher in the recovering groups), F+, non-F%, A% (although this tended to be higher in the declining groups).

The comparability of these data to other studies is at once limited by the restriction of the sample to females and the small number of cases. The usual difficulties in the non-equivalence of scoring apply here when one tries to compare the "declining" group with Singeisen's chronic population. Such comparisons rest on tenuous grounds. Nevertheless a striking disparity is apparent in the area of affective capacity. Singeisen and Metzer report intense and labile affect, while Ellis and Brown found a constricted emotionality characteristic for their group, as this variable is measured by the number and type of color responses. Further, a comparison with Lindner's data on the arrested veteran population (again made tenuous by the sex differences in the samples) presents a puzzling picture. The arrested veterans are describable by a number of neurotic signs pointing toward constriction. The reference group for the Ellis and Brown "recovering" sample is a declining population. We have only relative differences.

2. Self-assessments. Seidenfeld, using the Maller personality sketches with 50 unselected *TB* patients and 50 *healthy* college students, found 15 of the 100 items significant in distinguishing these two groups (61, 62). Most of these significant items referred to feelings of

nervousness, irritability and depression. Several were concerned with self-control, e.g., the patients more frequently characterized themselves as "doing things on the spur of the moment and then regretting it."

Several studies offer data based upon questionnaire measurements of introversion-extroversion. Neymann (53) gave the Neymann-Kohlstedt test to 300 college students, 300 factory workers and 300 tuberculosis patients picked at random from sanatoria. He reports that the college students tended to be extroverted, the factory workers showed no dominant trend, while the TB patients showed some tendency toward introversion. The percentages given for the patient group are: 46% rated introvert; 39% extrovert; 15% neutrovert. Neymann also separated 80 of the most far advanced cases of tuberculosis and found that 47% were extroverted, 41% introverted. He further states that the cases with minimal TB showed a greater predominance of introverted trends. Jones and Bogen (37) used this same questionnaire on 200 patients and found that the modal point was in the middle or "neutrovert" range. One hundred of these patients were ambulatory with quiescent lesions; the other half were bedfast with active lesions at the time of testing. Jones and Bogen also administered the Jasper elation-depression test and found that the bedfast group tended to give themselves more favorable self-judgments, though "moderate elation" characterized both groups. Further, they report a low incidence of neurotic complaints for the total sample.

Schultz (63, 64) gave the Bernreuter inventory to 82 male and 93 female tuberculosis patients and, using the general population norms for the questionnaire as a guide, noted that three-quarters of the men and two-thirds of the women in the sample were below the norm in the self-sufficiency items. Seventy-six and eight-tenths per cent of the men and 69.9% of the women showed "neurotic tendencies" above the norm. Approximately 70% of the patients showed an above-norm tendency to introversion. Schultz also reports the group scored above average on the sociability scale. He reports he found no differences related to seriousness of illness.

Wechsberg and Sparer (67) used Form N 3 of the Cornell Index in a comparison of the performance profiles of a hospitalized tuberculous group and a healthy college population. No significant differences were reported. They note that the age of the patients was not significantly related to test scores but that length of hospitalization had a low but positive relationship with the neurotic scores of the male patient (r tetrachoric = .65; p.e. = .07).

The above-cited studies offer comparative data for the tuberculous versus the healthy, and for active-quiescent, minimal-far advanced patient sub-group comparisons. It might be pointed out that favorable or unfavorable prognoses do not necessarily correspond to the differential diagnoses of minimal, moderately or far advanced TB although there is a general trend of agreement in the expected direction.

Evaluation of these results must consider the primary question of the applicability of paper-and-pencil test items to sanatorium patients. The life situation of the patients gives many of the responses to the questions different meanings from the same responses given by the healthy controls. The are-you-very-nervous type of item (one of the significant factors in the Schultz study) may perhaps be the expected response in terms of the reality facing the patient, with the real threat to physical well-being and the separation from significant persons and work. Barker *et al.* (1) have summed up the status of such tests: "It is clear that personality inventories of the kind now available are inadequate for research on somato-psychological problems. If differences in diagnostic scores are obtained, the possibility that this is an artifact due to items of differing interpretative significance cannot be eliminated. If, on the other hand, differences in scores are not obtained, the superficiality of the method leaves one unconvinced that important differences do not exist." (p. 180).

Two of the above-cited studies report that the tuberculous tend to be more introverted than the healthy controls (53, 64). However, the figures reported by Neymann (53) show small percentage differences; these were not evaluated for statistical significance. Further, the repeated application of the Neymann-Kohlstedt questionnaire for introversion-extroversion did not support these findings

(37). Several studies indicate greater maladjustment in the tuberculous group as compared with the non-tuberculous (62, 64). However, another report noted a low incidence of neurotic complaints (37). Neymann states that cases with advanced tuberculosis tend to be more extroverted and those with minimal spread of disease more introverted. As noted, these differences are slight and unevaluated for significance. Jones and Bogen report that the group with active lesions, contrasted with those with quiescent lesions, tended to give themselves more favorable self-judgments. Again, the data are not adequately presented or analyzed. This is perhaps the only study noting euphoric trends among the tuberculous.

The comparability of the above-cited findings rests in part upon the assumption that the various inventories ostensibly measuring similar personality variables in fact do constitute equivalent instruments. Ellis has offered a wealth of evidence to indicate the low validity of such methods (20). More specifically Bernreuter has reported on a correlational study of scores on the Bernreuter Personality Inventory and the Neymann-Kohlstedt and found an intercorrelation of .162 (4).

It would appear that the tuberculous differs from the healthy population on a variety of self-assessed measures of maladjustment. The considerations already referred to do not allow either a) generalizations with regard to specific psychological characteristics descriptive of the group as a whole or b) discerning whether there are personality characteristics which are not most economically attributable to the life situation confronting the hospitalized person with a serious illness. The data from inventories offer little bases for hypotheses with regard to possible personality correlates of differential outcome.

C. Observations based upon interview and clinical impressions

1. Interviews. (None of these reports offers evidence that a systematic method of interviewing was applied.) Strecker *et al.* (66) report their findings from a series of clinical interviews of 75 sanatorium patients chosen at random. The emotional reactions were classified as follows: fatalistic moods with feelings of bitterness and frustration, 35 cases; depression, 29 cases; marked mood swings, 2 cases; euphoric, 7 cases. The authors note that although the patients had plenty of time on their hands, only 13 stated that they did excessive daydreaming. "In none of the patients was the phantasy very deep or complicated . . . (however) the daydreaming was not wholly planless." (p. 536 . . .).

Muhl reports on a study employing direct and psychoanalytical techniques of interviewing of 30 female tuberculosis patients (49, 50). The following traits were noted in all of the cases: inertia, explosive affect, oscillating mood, anger and irritability, dissociative trends, hindered self-expression, depression, suggestibility, loss of interest, restlessness. The patients manifested a "two-fold mixed personality which shows strongly marked introvertive qualities suggestive of a praecox-like pattern on the one hand, and extroverted tendencies with a manic-depressive swing of a greater or less intensity on the other." This contradictory pattern leads to a "misuse" of both introverted and extroverted energies. Introverted energy is bound in fantasy and daydreaming; uneconomical expenditures occur in the discharge of tensions directed outward.

Friedman *et al.* report the results of psychiatric interviews of 100 unselected army cases of early tuberculosis (25). They state that the most characteristic personality features were independence and efficiency.

These three interview studies are difficult to evaluate. In no instance is there evidence that a systematic interview was the basis for observation. Hence the results are only too vulnerable to the bias of the interviewer in selecting and guiding the information elicited. Further, there is no differentiation with regard to the prognosis. None of these reports offers comparative data for other groups, nor do they isolate the factor of differential outcome.

2. "Impressionistic" observations. There are many articles to be found in the journals where medical and sometimes psychiatric personnel who have worked in a sanatorium offer their opinions with regard to personality characteristics observed with high frequency in TB patients, and also speculate with regard to the relationship between psychodynamic factors and the onset and outcome of the disease. The bases of observations are unspecified; pre-

sumably the frequent contact with the patients is the foundation for the generalizations proposed. The role of bias in such observations is completely uncontrolled. Nevertheless, these articles may offer suggestive leads toward the formulation of testable hypotheses.

Eric Wittkower, a psychiatrist who has studied the adjustment of tuberculosis patients and is regarded as one of the authorities on this question by the professional personnel working with patients, has published his clinical observations in book and article form (70, 71). He states that the pre-illness personality is often characterized by an inordinate need for affection and high conflict with regard to dependency wishes. To quote his views: "A high degree of dependence and difficulty in handling hostilities are a central feature in the premorbid personality of tuberculous patients. Some of these individuals display their inordinate need for maternal affection and allied dependent trends overtly—one may almost say in a blatant form—whereas others conceal them behind such psychological defences as self-assertiveness, ostentatious independence, excessive self-drive and aggressive and provocative behaviour. More often than can be due to chance situations which entail a rebuff, a separation from, a threat of losing or an actual loss of a supporting figure precede the onset of tuberculosis and of its relapses. The manner in which these personality features are related to a flare-up of a dormant lesion can be understood in two ways: either by lowering of resistance owing to an unhealthy mode of life or by psycho-pathological and autonomic mechanisms analogous to those operative in bronchial asthma."

Reference to the significance of the intensity of affectional need and conflict with regard to receiving support from other persons appears in many publications. Indeed it is almost the common denominator of the spate of impressionistic literature (3, 11, 16, 19, 35, 42, 47, 68).

Weiss and English have stated that a strong need for love and protection characterizes the tuberculous population (68). In a report of the proceedings of a case conference, the importance of the dependency factor as perceived by the staff of a large sanatorium is evident in the discussion (10). It was noted that hospital procedures may actually foster the dependency pattern. Patients who are close to discharge not uncommonly break down again. The staff discussion concluded with the statement that the patient required "consistent relationship experiences", as well as physical re-hardening, in order to maintain a "balance of ego-integrative as well as regressive impulses."

Coleman *et al.* (11) report on their observations of sanatorium patients that they find no specific personality factors with regard to the etiology of the disease but suggest that such factors may have relevance for differential prognosis. Patients with poor prognosis are described as having strong defenses against dependency. In another publication (3) Benjamin *et al.* report on 16 patients studied intensively by psychiatrists and psychologists. The common features noted were dependency conflicts or relatively uninhibited dependency strivings. Further, the authors observed that inhibited hostility seemed to be related to an unfavorable course of the disease, while the ability to express conscious hostility seemed related to a favorable outcome. In an early article, Jelliffe and Evans (35) interpreted the cough as an infantile call for help. Those who succumb to tuberculosis are said to be unable to sacrifice the infantile wish for dependent status. Ludwig (42) noted that the group with the most marked dependency needs responded most poorly to bed rest.

Ross and Stanbury (59) describe several reaction types in tuberculosis patients, among them a prolongation of hopeless fear with no ability to solve the adjustment problem or a denial of the seriousness of the situation. Speaking specifically of patients with poor prognosis, Morland (48) noted that these cases were characterized by marked anxiety states associated with "egocentricity in the extreme." Diffuse patterns for discharge of emotional energy, especially associated with unfavorable prognosis, have been remarked upon by several writers (6, 22, 49, 50). They stressed the inadequate capacity for adaptive channeling of drives. Breuer (6) counsels that patients ought to be trained in the recognition of signs of fatigue and in acting upon this recognition by rest. This argument may perhaps be considered as reflecting the importance of well-organized behavioral control mechanisms for prognosis. Morland and Breuer both noted that marked

over-compensation, i.e., over-activity of a diffuse nature, is associated with unfavorable outcome. Muhl and Eyre both noted that attempts to deal with conflicts by repression are frequently found in chronic sanatorium patients.

D. Incidence of tuberculosis in neuropsychiatric populations

Reports by William A. White and Nolan D. C. Lewis on the incidence of the disease in psychiatric populations are highly provocative (39, 69). They found that tuberculosis was three times as prevalent in schizophrenics as in all other psychiatric groups considered together. Paranoids and paranoid schizophrenics were excluded from the schizophrenic classification and grouped together. The data on incidence rates among patients at St. Elizabeth's Hospital are as follows:

Schizophrenics	317 per 1,000	
Epileptics	60 per 1,000	
Cycloid (manic-depressive)	24 per 1,000	104 per 1,000
Paranoid and paranoid schizophrenics	20 per 1,000	

The authors interpreted these findings in the following manner: The schizophrenic psychosis may be considered as non-compensating or de-compensating in its process. Patients show little active tendency to get well, nor do they develop compensating reactions, e.g., the delusion formations of the paranoid, the hyperactivity of the manic. This reaction of the schizophrenic to his psychologic illness is "in harmony" with the reaction at the somatic level. These patients are infected more easily, and die more easily. They tend to have no ability to protect themselves from the disease. They do not develop an adequate fibrosis (scar tissue around the lesion) which would either lead to arrest or else delay the rapidity and reduce the extent of disease spread.

"Both types of reaction . . . the psychologic and the somatic, may be properly classified as regressive . . . the regressive tendency is shown at the psychologic level by the development of simpler mental mechanisms and simpler mental content, whereas at the somatic level, in similar fashion, the highly complicated parenchymatous tissues tend to be replaced by much simpler interstitial types." (p. 893, 69).

White briefly notes some of the personality characteristics of this group: they are more oriented toward thought than action, they are described as introverted, negativistic, and egocentric.

That the White and Lewis findings are not simply a function of the schizophrenic group's greater susceptibility to physical disease, regardless of kind, is evidenced by the data on the incidence of cancer and circulatory failures:

	Incidence of (a) *Cancer*	(b) *Circulatory Failures*
Schizophrenics	43 per 1,000	32.2 per 1,000
Epileptics	10 per 1,000	49.5 per 1,000
Cycloid	112 per 1,000	60.6 per 1,000
Paranoid	136 per 1,000	149.2 per 1,000

These observations are of extreme interest because, if one interprets them within the same framework as the tuberculosis data, one finds that over-compensatory psychiatric types (cycloid and paranoid) tend to develop disease processes characterized by over-compensation.[1]

A relatively recent discussion in the Lancet (33) on tuberculosis patients with no gross psychiatric disturbances is consistent with the general theory advanced by White. The author describes the "rhythm" in the bodily response to infection: a stage in which the infection has sufficiently provoked the body tissues is followed by a crisis which calls into play defense against disease by walling off the lesion. This arousal of defense is crucial for combating the disease and preventing the infiltration of more tissue. In certain cases, however, the whole pattern is "indolent"; the organism is not ready to "fight the matter out."

Since some of the hypotheses in the present investigation are guided by this formulation, one of the results will be an evaluation of the fruitfulness of such physiological paradigms for psychological research.

III. Conceptualization of the Problem in the Current Investigation

The aim of the current investigation is to attempt discrimination on the basis of performance on a series of instruments between

[1] A separate study of patients with cancer of the lung, to be compared with the tuberculosis group, is under way in order to determine if there are personality differences correlated with the *disease process per se* (when the organ involved is the same) in a (psychiatrically) normal population.

patients with chronic tuberculosis, unfavorable prognosis on the one hand, and individuals who have achieved an arrest of the disease on the other. No assumptions with regard to causality are essential to the framework of the present study. Perhaps the best approximation to the theoretical assumption underlying the study, but not essential to it, would be the proposition tuberculosis (and its course), and personality variables may be viewed as outcomes of a complex matrix of psychologic, physiologic and socio-economic variables.[2]

There are suggestive leads in the literature which point towards hypotheses which may be formulated in advance of the analysis of the present data. The criteria used for the selection of substantive hypotheses are the adequacy of the empirical procedures and treatment of data and the fruitfulness of the observations for an integrated conceptualization.

Most of the patient groups previously studied are not distinguished in terms of prognosis or outcome. The procedure used here is to predict that characteristics observed in TB in contrast with non-TB will occur with greater frequency among chronic subjects in contrast to an arrested sample.

The Rorschach data suggest the following: Arrested tuberculous subjects may show a neurotic pattern of performance, particularly of a rigid and emotionally constricted order (40). Chronic patients may show intensive labile affect and impulsivity, lack of adequate control mechanisms, and generally extratensive patterns (45, 65). However, Ellis and Brown's study suggests the alternative proposition, that chronic patients with unfavorable prognoses, as compared with recovering patients, would tend to manifest constricted affect and productivity and a lack of conventionality of thought process. Further, they produce fewer human movement responses (21).

Data from several studies based upon self-assessment through questionnaires administered to tuberculous patients indicate that a lack of control mechanisms (62), low self-sufficiency and introversion (63, 64) may be pertinent variables.

The array of impressionistic interview and observational reports suggest the following hypotheses: Patients with unfavorable prognosis may be more frequently characterized by passive-dependent features (71, 11), inability to resolve conflict (59), diffuse pattern for energy discharge (6, 48, 50), and internal hostility tensions (3) than subjects with a favorable outcome for the disease.

Lewis and White's data lead to the additional hypotheses that a greater orientation toward thought than action, negativistic, egocentric behavior and regressive features would tend to describe the chronic patients as contrasted with arrested subjects (39, 69).

Arrested tuberculosis subjects are predicted to evidence more capacity for overcoming frustration by compensatory means for counteraction than are the chronic patients with unfavorable prognosis. The use of a physiological model as a guide to the conceptualization of personality characteristics which may be related to outcome suggests a more general hypothesis: the criterion groups may be differentiated upon the basis of regression-retreat versus active defense in the face of stress. This general formulation guides the following subsidiary hypotheses: 1) Interpersonal relationships are perceived as more threatening and conflicting by the chronic subjects. 2) The chronics tend to perceive themselves as less capable of coping with stress, or they show fewer indicators of adequate coping and control mechanisms. 3) Chronic subjects will show signs of withdrawing from social contacts and activities.

IV. Methodology

A. Sample characteristics

The 66 subjects in the present investigation consist of 1) 41 cases with tuberculosis of the

[2] A survey by the New York State Committee on Tuberculosis and Public Health (9) showed that tuberculosis death rates are directly related to income level. Mortality rates are from 4 to 10 times as great in low-income areas as in the higher economic level areas. The Negro population was not a significant factor in any of the areas surveyed, the percentage of Negroes never exceeding 2%. That ethnic group membership is also related to tuberculosis incidence is shown in a report by the New York Tuberculosis and Health Association (17).

In 1950, in New York City, the death rate among the white population was 22 per 100,000 whereas in the non-white it was 110. A five year average of the annual death rate for the nation (1946–1950) shows the rate per 100,000 to be 73.2 for Negro males, compared with 30.1 for white males (17, p. 3).

lung, diagnosed as chronic and having unfavorable prognosis for the disease, and 2) 25 cases with arrested tuberculosis, having favorable prognosis for maintaining the arrest of the disease. The definition of chronic status with unfavorable prognosis is provided by the decision of the medical personnel at the various sanatoria and institutions upon the basis of x-ray and other medical findings. The arrested subjects in this study have all been diagnosed "cured" or "apparently arrested" for at least one year prior to testing. All are being continually followed-up from once to three times per year, depending upon the length of time since discharge. Only those cases in which the prognosis is for maintenance of arrest are included.

The subjects range in age from 25–63. While the mean age for the chronic group, 47.4 is somewhat higher than the average of 41.7 for the arrested sample, the distributions of cases by age decade are equivalent. Most of the subjects are male; there are 5 female cases in the chronic group and 6 in the arrested sample.

No case has been included in which there is a history of any other major disease or surgery. The exclusion of surgical experience also applies to operations for tuberculosis. All patients have been obtained through public agencies; they are comparable with regard to socio-economic status. All patients are literate, having at least 6 years of formal education. All are members of the caucasian group.

Two variables which may be of importance for evaluating the findings are not controlled in the present investigation, namely, hospitalization and the existence of an active disease process.[3] The relevance of these factors for inferences drawn from the current findings will be considered when the results are discussed.

B. Measurements

The following tests will be used: 1. Rorschach test; 2. House-tree-person drawings; 3. Rosenzweig picture-frustration test; 4. Szondi test.

[3] A third group of patients, hospitalized at the time of measurement but having *favorable* prognosis, is now being studied in order to determine the significance of this factor in discriminating persons with favorable and unfavorable outcomes in pulmonary tuberculosis.

All conclusions from the data of course are contingent upon the reliability of the scoring and interpretive schema of the respective instruments. The investigator will attempt to make as explicit as possible the empirical bases for all interpretations. Thus, if future research should indicate different significance for the performance characteristics considered, the data of this study can be re-interpreted.

C. Mode of analysis: method of codification and evaluation

The procedure adopted in this study has been to specify the empirical hypotheses in advance of the analysis of the data in so far as it was possible. This has been done in order to minimize the inflation of "significant" findings which can occur when an unlimited number of significance tests are implicitly or explicitly performed. The performance items presumed to be the empirical correlates of given personality variables will be precisely defined.

1. The Rorschach method. Scoring of responses generally adhered to the system of Klopfer and Kelly (38). The form responses were evaluated with Beck's standards (2). Crediting of Popular responses was based upon a pool of all listed percepts reported in the major texts (2, 38, 56).

The first phase of evaluation of Rorschach data involves the determination of mean differences in scores on a variety of test variables. It has been shown that scores from this test, with the exception of the response total, tend not to be normally distributed (13, 14, 15). Therefore, statistical treatment of mean differences will be accomplished with the use of the non-parametric method of rank order, where indicated (52). Examination of the distributions of scores reveals that for many variables, the distribution tends to approach normality in the arrested group but is sharply skewed to the left in the chronic population. While a t-test based upon the rank order method would indicate that the chronic group tends to have lower scores, it does not provide a complete or exact description of the findings. For a series of variables, we may distinguish between the two groups accurately in terms of the different frequencies of complete absence of a particular

score. This zero versus non-zero dichotomy also diminishes the dependence of the score upon the response total. The chi-square statistic will be used in evaluating group differences.

All scores have been adapted to a two-point system of categorization. The use of dichotomies raises the issue of the establishment of criteria for cut-off points. All scores have been codified by one of the following procedures: 1) Where norms exist, these have been used. 2) A zero versus non-zero classification has been used with a series of scores, thus separating subjects who manifest none of a particular characteristic from those who show the characteristic in some quantity. 3) The remaining scores have been dichotomized in terms of whether or not they fall within an extreme third of a distribution based upon a pooling of both samples.

This method of analysis is of special value because it makes possible the location of individual cases who manifest particular characteristics. It permits the tabulation of the frequencies of occurrence of configurations of scores and therefore allows for inferences with regard to the psychological structure of the behaviors measured.

A given pattern may not apply to the majority of the cases in one of the major groups. Nevertheless, integrated conclusions or interpretations based upon such patterns would have a better empirical basis than interpretations based upon a *presumed* composite of single item scores. It is almost axiomatic to state that no one test factor can be considered singly in making an interpretation. Too many studies based upon projective data *assume*, rather than test, that the findings for the array of single items represent the existence of equivalent performance patterns for the individual cases.

The pattern tabulation data are derived from *ex post facto* analysis. However, only a limited number of tests for the significance of the frequency of occurrence of patterns were performed. With but two exceptions, only those items which were found to discriminate between the two groups were used in the determination of configurations. A consideration limiting the number of combinations of scores investigated was that of minimizing redundancy. Where different scores could be related to some common factor, no examination of possible coexistence was attempted. Further, the empirical investigation for significant patterns was guided by hypotheses with regard to those items which would seem to constitute psychologically coherent constellations. Particularly, the approach employed was to focus upon the presence or absence of patterns revealing counter-balancing mechanisms.

2. Figure drawings. The Goodenough scale has been adapted in order to provide a general measure of the capacity for sustained integrated and planned performance (26). A subscale of 20 items selected from the 46 used above will be employed as a measure of primitive functioning; these items concern the representation of essential features and the handling of proportion. The t-test will be used to evaluate group differences in the number of scorable credits. Chi-square will be used to determine the extent to which differences in the presence or absence of particular items are beyond chance expectations. Particularly, the groups will be compared with regard to the adequacy of representation of clothing.

Subjects were given a brief inquiry with respect to the possible activity of the persons drawn. The responses to this question will be evaluated with chi-square, with the dichotomy consisting of action versus passivity and inaction.

3. Rozenzweig picture-frustration test. The t-test for mean differences will be used to determine the discrimination between the groups for the number of responses to a particular category. The standard scoring system was used, and the available normative data will be checked with the behavior of the criterion groups.

4. Szondi test. The t-test will again be used to evaluate differences in the choice patterns.

D. Hypotheses

The following characteristics are hypothesized to discriminate between the chronic and arrested groups; each proposition is predicted to be more descriptive of the chronic sample:

Descriptive Statement	*Empirical Statement* (predicted performance characteristics)
(1) Low level of productivity	(1) Rorschach: Response total less than 15
(2) Reluctance to respond to presented tasks	(2) Rorschach: One or more rejections
(3) Stereotypy; restriction of interest	(3) Rorschach: Animal or anatomy responses equal 50% or more of total
(4) Non-conformity of thought processes; low adaptation to social situations	(4) Rorschach: Number of Popular responses equal 5 or less
(5) Low concern for social adaptations	(5) Rorschach: Human responses below 20% of total. Drawings: Lack of clothing for figures
(6) Inability to find socially adaptive modes of discharge psychic tensions	(6) Rorschach: Absence of Form-Color response with good form level
(7) Lack of capacity for delay of impulse expression; limited social sensitivity	(7) Rorschach: Absence of Form-Shading response with good form level
(8) Impulsivity of affect and action	(8) Rorschach: Predominance of color and shading responses without good form integration over such responses with form integration
(9) High aggressive tensions within the person	(9) Rorschach: Content of animal and human movement responses will indicate hostility. Rosenzweig: High Intropunitive and Extropunitive scores Szondi: Positive choice of sadist pictures
(10) Passivity	(10) Drawings: Associations to drawing will indicate inaction
(11) Constricted affect	(11) Rorschach: Absence of color responses; absence of shading responses; absence of color-form response
(12) Block of responsiveness in situations with strong emotional components	(12) Rorschach: Percentage of responses to last three cards below 30%. Highest frequency of failures in colored blots. Longest reaction time occurs on colored cards
(13) Limited "energy" or "drive"	(13) Rorschach: Lower production of animal movement responses; total absence of such responses
(14) Introversion	(14) Rorschach: Higher number of human movement responses; greater percentage of human movement responses
(15) Mode of approach to situations	(15) (a) Rorschach: Whole responses constitute 50% or more of total
(a) Global approach to stimuli	
(b) Diminished interest in the practical and obvious aspects of situations	(b) Rorschach: Number of large detail responses equal 5 or less
(c) Inadequate ability for differentiating refined details	(c) Rorschach: Complete absence of small and/or rare detail responses
(d) Perceptual dysfunction	(d) Rorschach: Incidence of whole responses of poor form quality; general low level of form quality in whole responses
(e) Inadequate ability for analysis, planning, and correction of performance	(e) Drawings: higher incidence of negative scores on items in Goodenough scale measuring basic proportion and integration of the drawn whole
(16) Autistic fantasy	(16) Rorschach: Presence of human movement responses of poor form

V. Results

A. Rorschach data

Data presented in table 1 confirm a number of expectations with regard to Rorschach performance differences. The chronic group may be distinguished from the arrested sample with regard to their lower level of productivity (Response total), greater difficulty in making social adaptations (Populars and Fc+), relatively constricted affect (color and shading scores), limited "drive" (animal movement and sum of movement and color), and diminished interest in the obvious features (large details) as well as in more refined differentiation of stimuli (tiny and rare details).

Since the groups differ sharply with respect to the mean response total, it could be proposed that other obtained distinctions might be regarded as functions of this difference in re-

TABLE 1.—RORSCHACH PERFORMANCE GROUP MEAN DIFFERENCES

	Chronic	Arrested	t	Prob.
Number D	7.5	14.0	3.34	.001
Sum (Color and Shading)	3.0	5.3	3.04*	.003
Number Populars	5.5	7.32	3.03	.003
Response Total	15.07 (s.d.—9.5)	25.1 (s.d.—14.6)	2.99	.004
Sum Shading R	1.33	2.6	2.85*	.01
Number Dd plus Dr	.98	3.36	2.74*	.01
Sum Color R	1.68	2.58	2.59*	.01
Sum (Fc+ and Fc±)	.85	2.04	2.55*	.02
Number Fc plus	.32	1.12	2.42*	.02
Sum (M plus Sum C)	3.56	4.36	2.27*	.05
Number Color-form	.56	1.04	2.21*	.05
Number FM	2.37	3.52	2.18*	.05

Note: Where the t value is marked with an asterisk (*), the method for computation used is the non-parametric formula,

$$t \text{ equals } \frac{2R' - n(N+1)}{\frac{6(N+1)(N-n)}{3}}$$

where R′ equals the sum of the ranks of the smaller sample, n equals the number of cases in that sample, and N equals the size of the combined samples. This rank method was used in those instances where the distribution of scores in one or both of the sample groups deviated markedly from normality.

sponse level. The relationship between response total and other scores has been quantitatively evaluated and will be presented in some detail in a later section. At this point, however, the question of what is meant by "association" might be raised. To state that a given type of response and its magnitude are associated with the total number of responses is not to elucidate the nature of the association. Low responsiveness as a general characteristic may indeed be expected to depress responses of particular types. The interrelationship, however, may be more complex; the inability to utilize a variety of determinants may be related to the low response total. In short there may be a functional interrelationship between low responsiveness and the magnitude of particular part-scores. Some evidence for this formulation can be obtained from inspection of table 1a. The groups do not differ with respect to such scores as the average number of Whole responses or human movement percepts. These findings would seem to suggest that there is a selective inhibition of particular types of percepts.

Table 1 indicates scores for which significant mean differences were obtained. The response total, number of populars, and number of large details were the only variables found to have distributions not significantly different from normal. For all other scores, the distributions were sharply skewed to the left in the chronic population; the comparable curves for the arrested sample approached the normal function. Although it would not be incorrect to state that the chronic group produced, on the average, fewer color and shading responses, fewer tiny and rare details, fewer form-shading responses of adequate form level, fewer animal movement responses, a distinctly lower total for the experience balance scores, this would not be a complete description of the findings. An inspection of the skewed distributions reveals that there is a high frequency of chronic

TABLE 1a.—RORSCHACH PERFORMANCE MEAN DIFFERENCES—SCORES WHICH DID NOT DISCRIMINATE

	Chronic (N 41)	Arrested (N 25)
Number W	6.17	6.92
Number Space	.78	1.2
Number M	1.8	1.9
Number m	.76	.88
Number pure C	.51	.52
Number FC	.59	.92
Number FC plus-minus	.53	.92

TABLE 2.—RORSCHACH PERFORMANCE—FREQUENCY OF OCCURRENCE

	% Chronic (N = 41)	% Arrested (N = 25)	Chi Square*	Prob.
One or more rejections	48.78	4.0	12.4*	.001
P = 5 or less†	58.5	16.0	11.7	.001
D = 5 or less†	48.8	8.0	9.9*	.005
Absence of Fc plus	73.2	40.0	7.2	.01
M% = 14% or more†	46.3	12.0	6.8*	.01
W% = 50% or more	46.3	12.0	6.8*	.01
A% = 50% or more	68.3	36.0	6.6	.01
Sum M plus Sum C = 2.0 or less†	51.2	20.0	6.3	.02
Absence of Color R	39.02	8.0	6.1*	.02
Absence of CF	65.9	36.0	5.6	.02
M Response to card I and/or card II	46.3	16.0	5.0	.025
Response total 10 or less	29.3	4.0	4.8	.05
Dd and/or Dr = zero	46.3	20.0	4.7	.05
Absence of FM	21.95	0.0	4.6*	.05
Absence of Shading R	39.02	12.0	4.3*	.05
Sum Color plus Sum Shading = 1.5 or less†	43.9	16.0	4.3*	.05
Absence of FC plus	65.0	40.0	4.2*	.05
$\frac{R(VIII–X)}{R}$ under 30%	43.9	20.0	3.9	.05

* Chi-square values marked (*) have been corrected for the occurrence of a theoretical frequency below 10.

† Scores that are marked with (†) have been established by pooling the two distributions and establishing a cut-off point that separates an extreme third of the scores.

patients who gave no response which could be scored in the categories just mentioned.

Table 2 presents group differences on a series of Rorschach scores in terms of frequency of occurrence. The results have been converted to percentages for the purposes of presentation since the samples are not equal in size. Table 2 presents data on variables which have been included in table 1 and table 1a, except that the scores have been dichotomized.

	I	*II*	*III*	*IV*	*V*	*VI*	*VII*	*VIII*	*IX*	*X*
No. chronic (N = 41)	0	3	4	4	5	8*	9*	2	13*	12*
No. arrested (N = 25)	0	0	1	0	0	0	0	0	0	1

* The group differences between the frequencies of refusals to respond for these cards are beyond chance expectations.

The following results, two of which were not expected, occurred with greater frequency in the arrested group:

	% *Chronic*	% *Arrested*	*Chi-Square*	*P*
FM = 4 or more	24.4	56.0	6.7	.01
Anatomy R one or more	29.3	64.0	7.7	.01
One or more Fc′	36.6	72.0	11.2	.001

The measures have been ordered with reference to their probability values. Since an extensive pattern treatment of scores in table 2 is to be presented below, there will be no detailed discussion of these single scores at this juncture.

The lower productivity of the chronic group has already been noted. Over two-thirds of these patients show an impoverished range of ideational content and marked stereotypy (as measured by A% $\geqq$ 50). Almost half of the chronics reject one or more cards. Cards IX, X, VII, and VI, in that order, were the most frequently rejected. A card-by-card breakdown of refusals is presented below:

Fifty-eight and five-tenths per cent of the chronic sample, compared to 16% of the arrested group, produce five or less Popular answers. This finding becomes more striking when it is recalled that a group of over 30 "Populars" was potentially scorable. Thus, we may say that more of the chronics show a limited ability to share in socially common perceptions and thereby infer a diminished adaptability. Almost three-quarters of the group fail to produce even one Fc+; this score when given presumably taps the capacity for delay-

ing impulse expression and reflects a cautious sensitivity. Further, 65.9% of the chronic group show no evidence of ability for developing emotional rapport insofar as this is measured by the FC+ percept.

Table 2 adds a considerable amount of new information with regard to performance differences between the chronic and arrested samples. Although the average number of M and W responses did not differentiate the two groups, we can see that significant differences are found when using the percentages. Chronic patients tend to produce more M responses relative to their response total, lending some confirmation to the expectation of greater introversive trends. Further, if we assume that subjects who give M responses to card I and/or II have a lower threshold for perceiving kinesthesis than subjects who do not produce an M until the third and "popular" M card, we find again that significantly more individuals in the chronic group show this disposition toward human movement perception. Forty-six and three-tenths per cent of the chronics, compared with only 16% of the arrested, produce the M response in these first two cards. Reaction time data are in harmony with this observation. A rank order of initial reaction times to the ten cards was obtained for each record, and then the average rank per card was calculated for the two samples. Card I showed the lowest average ranking for initial reaction time in both groups. However, whereas Card II was second in average ranking in the chronic group, it was fifth in the arrested group. In sum, chronic patients tended to respond more rapidly to card II than did the arrested samples. (This difference in average rank RT to card II was significant; $t = 2.55$, $P = .02$.)

Mention might be made of several somewhat unexpected findings. More subjects in the arrested group produce one or more anatomy responses. Such responses are generally interpreted as indicating an anxious preoccupation with bodily function. Further, more arrested than chronic subjects give responses utilizing the dark grey and black color values found on certain of the blots. The use of this stimulus characteristic is presumed to be an index of fearful depressive trends, and may imply phobic features. One wonders why the chronic sample does *not* produce these responses as frequently; one might anticipate some signs of bodily anxiety and depression in persons having a serious, incapacitating illness. Indeed, some indication of these features in limited degree would seem to be even an appropriate reaction to the life situation of the chronic tuberculosis patient. One might further speculate that if the arrested patient has a continuing awareness of potential reactivation of disease, this awareness might have the positive function of making the person exercise caution in his activities and thus maintain his arrested status.

Table 2a presents scores which did not discriminate between the two groups. Certain of these insignificant findings contradict hypotheses set forth above.

The incidence of W − responses is high in both groups. A more refined method of analysis, involving scaling of all whole responses with respect to form level on a five-step scale, failed to differentiate the two groups.

A low H% was characteristic for the great majority in both samples. The predicted greater incidence of the M − response is shown, but fails to reach statistical significance.

Other scores, presumably indicative of defective adaptations, reveal surprisingly that there is some tendency for more arrested sub-

TABLE 2a.—Rorschach Performance—Frequency of Occurrence
(These scores did not significantly discriminate between the two groups)

	% Chronic	% Arrested
No M Response	24.4	12.0
H% below 20%	75.6	84.0
One or more W−	58.5	48.0
One or more pure C	39.02	32.0
One or more m	39.02	60.0
One or more pure c	19.5	28.0
One or more FC−	12.2	4.0
One or more Fc−	12.2	24.0
One or more FM−	29.3	52.0
One or more S	48.8	64.0
One or more Dr	46.34	72.0
Perseveration	26.8	28.0
One or more M−	17.1	4.0
F% = 50 or more	43.9	36.0
F% = 60 or more	26.8	15.0
FC ≧ (CF+ C)	19.5	30.0
Sum C plus Sum c = 0	21.9	4.0
Sum c more than Sum C	24.4	40.0
Sum C more than Sum c	48.8	56.0

jects to produce them as compared with the chronics: note the greater percentage of the former group producing one or more Fm− and Fc−. Also, the m and c responses, representing diffuse anxiety, are more frequently given by the arrested subjects.

The groups do not differ in the frequency of individuals who show perseveration, as measured by the presence of three or more responses of the same content. Twenty-eight per cent of the arrested sample and 26.8% of the chronic subjects evidenced this characteristic. There were no differences in the content of the percept which was the subject of the perseveration. It might be noted that no chronic female was scored for perseveration although one arrested female was so scored.

One hypothesis predicted greater impulsivity and a lack of effective control of affect and action as characteristic of the chronic group in contrast to the arrested. If we approach the assessment of this variable by the traditional expectation of a predominance of "controlled" over "impulsive" features, or at least of a balance between them, we cannot discriminate between the samples. The findings below are set forth with more detail than table 2a:

	% *Chronic*	% *Arrested*
FC more than (CF plus C)	7.4	16.0
FC = (CF plus C)	12.2	24.0
(CF plus C) more than FC	39.02	52.0

The differences which would lead to the confirmation of the expected greater affective control in the arrested group—while in the correct direction—are slight and insignificant. These findings lead one to question the utility of using a hypothetical model of "ideal" balance and integration as a base line for evaluating personality at least with regard to the interpretation of Rorschach data. Following the usual interpretation of "normal" functioning, we may state that the arrested group tends to show evidence of difficulties in adaptations. The greater frequency of anxiety indicators has been pointed out. What emerges at this point of the analysis is the tentative proposition that within the context of conflict, depression and anxiety, there are also indicators of positive coping mechanisms. The psychological difficulties do not inhibit the productivity, and adaptation though not always adequate is maintained in the arrested sample.

In contrast, what seems to describe the chronic group is an impoverishment both of output and attempts at adaptation. The ideational processes would not seem to have undergone the general inhibition.

However, rather than speculate as to the possible interrelationships among the part-scores reported thus far, we will defer further interpretation until the pattern data are presented. All but one of the items included in the pattern analysis are those which had been found to discriminate between the two groups (see table 2). The W− score, though not discriminating when taken singly, has been added in order to determine whether it occurs in constellations which are psychologically as well as statistically significant.

The empirical analysis of two-variable patterns was guided at first by certain hypotheses as to the scores which one might expect to coexist from the results of the analysis of data up to this point. It became clear that there were a strikingly high number of two-variable patterns which significantly distinguished the two groups. The procedure finally adopted, therefore, was to test all possible two-score patterns and, using the significant ones in a later stage of analysis, to select patterns involving three or more variables which appeared relevant to the hypotheses of the study.

Eliminating spurious patterns (such as the absence of CR and the absence of the FC response, or the absence of the Fc response and the sum of color and shading response), we arrived at 158 possible two-variable patterns. Of these, 99 distinguished between the chronic and arrested sample at the .05 level or better. Actually, five of these patterns involve three variables since in the tabulations the W% together with one or more W− score was treated as a single variable. These scores will be discussed below.

Table 3 reports all the two-score patterns found to be of significant discriminating power. The data have been ordered with respect to the number of cases in the chronic group which may be described by a given score. We may note that 49 of the patterns reported on table 3 describe one-third or more of the chronic patients. Before discussing the substantive aspects of these data, it is noteworthy that the findings on table 3 show a marked decrease in the overlap of scores as compared with the

TABLE 3.—TWO-SCORE PATTERNS—SIGNIFICANT AT OR BEYOND THE .05 LEVEL

	% Chronic	% Arrested
(Fc = 0) − (CF = 0)	58.5	12
(CF = 0) − (FC = 0)	58.5	20
(Fc = 0) − (FC = 0)	58.5	24
(Fc = 0) − (Rej. ≧ 1)	53.7	4
(A% ≧ 50) − (Rej. ≧ 1)	51.2	4
(P ≦ 5) − (Fc = 0)	51.2	8
(P ≦ 5) − (CF = 0)	51.2	8
(Fc = 0) − (A% ≧ 50)	51.2	16
(P ≦ 5) − (FC = 0)	51.2	16
(CF = 0) − (Rej. ≧ 1)	48.8	0
(Fc = 0) − (D ≦ 5)	48.8	4
(A% ≧ 50) − (CF = 0)	48.8	16
(A% ≧ 50) − (EB ≦ 2)	48.8	16
(Fc = 0) − (EB ≦ 2)	46.3	12
(P ≦ 5) − (Rej. ≧ 1)	46.3	4
(Rej. ≧ 1) − (FC = 0)	43.9	4
(Rej. ≧ 1) − (EB ≦ 2)	43.9	4
(CF = 0) − (D ≦ 5)	43.9	4
(FC = 0) − (D ≦ 5)	43.9	8
(P ≦ 5) − (A% ≧ 50)	43.9	8
(FC = 0) − (A% ≧ 50)	43.9	16
(P ≦ 5) − (EB ≦ 2)	41.5	8
(Fc = 0) − (W% ≧ 50)	39.0	0
(W% ≧ 50) − (D ≦ 5)	39.0	0
(D ≦ 5) − (EB ≦ 2)	39.0	0
(CF = 0) − (M% ≧ 14)	39.0	4
(P ≦ 5) − (D ≦ 5)	39.0	4
(A% ≧ 50) − (R(VIII–X)/R < 30%)	39.0	8
(Fc = 0) − (Dd = 0)	39.0	8
(Fc = 0) − (M% ≧ 14)	36.6	0
(FC = 0) − (W% ≧ 50)	36.6	4
(FC = 0) − (M% ≧ 14)	36.6	4
(CF = 0) − (W% ≧ 50)	36.6	4
(CF = 0) − (R(VIII–X)/R < 30%)	36.6	4
(Fc = 0) − (Sum C = 0)	36.6	4
(R(VIII–X)/R < 30%) − (Rej. ≧ 1)	36.6	4
(Sum C plus Sum c ≦ 1.5) − (Rej. ≧ 1)	36.6	4
(A% ≧ 50) − (D ≦ 5)	36.6	4
(Fc = 0) − (M I–II)	36.6	8
(CF = 0) − (Dd = 0)	36.6	8
(P ≦ 5) − (Sum C = 0)	34.2	4
(W% ≧ 50) − (Dd = 0)	34.2	4
(FC = 0) − (Dd = 0)	34.2	8
(Sum c = 0) − (CF = 0)	34.2	4
(A% ≧ 50) − (Sum c = 0)	34.2	8
(A% ≧ 50) − (Dd = 0)	34.2	8
(P ≦ 5) − (Sum C plus c ≦ 1.5)	34.2	8
(A% ≧ 50) − (W% ≧ 50)	31.7	4
(P ≦ 5) − (W% ≧ 50)	31.7	4
(P ≦ 5) − (R(VIII–X)/R < 30%)	31.7	4
(Dd = 0) − (Rej. ≧ 1)	29.3	0
(M% ≧ 14) − (Rej. ≧ 1)	29.3	0
(Sum C = 0) − (Rej. ≧ 1)	29.3	0
(M% ≧ 14) − (P ≦ 5)	29.3	0
(W% ≧ 50) − (EB ≦ 2)	29.3	0
(D ≦ 5) − (Dd = 0)	29.3	0
(Dd = 0) − (EB ≦ 2)	29.3	0
(Sum C = 0) − (M% ≧ 14)	29.3	0
(Sum C = 0) − (D ≦ 5)	29.3	0

TABLE 3.—CONTINUED

	% Chronic	% Arrested
(Sum c = 0) − (Rej. ≧ 1)	29.3	4
(Sum c = 0) − (P ≦ 5)	29.3	4
(FC = 0) − (M I–II)	29.3	4
(M% ≧ 14) − (M I–II)	29.3	4
(W% ≧ 50) − (Rej. ≧ 1)	26.8	0
(P ≦ 5) − (Dd = 0)	26.8	0
(W% ≧ 50) − (W minus ≧ 1) − (Fc = 0)	26.8	0
(W% ≧ 50) − (W minus ≧ 1) − CF = 0)	26.8	0
(W% ≧ 50) − (W minus ≧ 1) − (FC = 0)	26.8	0
(W% ≧ 50) − (W minus ≧ 1) − (D ≦ 5)	26.8	0
(CF = 0) − (M I–II)	26.8	4
(Dd = 0) − (R(VIII–X)/R < 30%)	26.8	4
(Rej. ≧ 1) − (D ≦ 5)	24.4	0
(Rej. ≧ 1) − (M content)	24.4	0
(Dd = 0) − (Sum c = 0)	24.4	0
(M% ≧ 14) − (Sum c plus C ≦ 1.5)	24.4	0
(Sum C plus c ≦ 1.5) − (D ≦ 5)	24.4	0
(Sum C plus c ≦ 1.5) − (Dd = 0)	24.4	0
(M% ≧ 14) − (W% ≧ 50)	24.4	0
(M% ≧ 14) − (D ≦ 5)	24.4	0
(M I–II) − (D ≦ 5)	24.4	0
(D ≦ 5) − (R(VIII–X)/R < 30%)	24.4	0
(A% ≧ 50) − (M I–II)	22.0	0
(Rej. ≧ 1) − (M I–II)	22.0	0
(W% ≧ 50) − (W minus ≧ 1) − (P ≦ 5)	22.0	0
(P ≦ 5) − (M content)	22.0	0
(D ≦ 5) − (M content)	22.0	0
(M% ≧ 14) − (Sum c = 0)	22.0	0
(Sum c = 0) − (D ≦ 5)	22.0	0
(M I–II) − (Sum C = 0)	22.0	0
(Sum C = 0) − (W% ≧ 50)	22.0	0
(Sum C = 0) − (R(VIII–X)/R < 30%)	22.0	0
(W% ≧ 50) − (R(VIII–X)/R < 30%)	22.0	0
(P ≦ 5) − (M I–II)	19.5	0
(W% ≧ 50) − (M content)	19.5	0
(Sum C = 0) − (Dd = 0)	19.5	0
(FC = 0) − (FM = 0)	19.5	0
(M% ≧ 14) − (R(VIII–X)/R < 30%)	19.5	0
(W% ≧ 50) − (M I–II)	19.5	0
(FM = 0) − (EB ≦ 2)	19.5	0

single item data on table 2. Forty-nine of the 99 significant pattens have a zero incidence in the arrested group. Twenty-eight additional two-score patterns occur in only one instance in the arrested sample. Only two of the patterns include 20% or more of the arrested cases. In contrast, only one of 18 scores in table 2 has a zero incidence in the arrested group; two scores occur in only one instance; seven of the 18 scores occur in 20% or more of the arrested sample.

To elaborate upon the psychological significance of this decrease in overlap let us take for example the (Fc = 0) − (FC = 0) pattern. The score indicates that the patient has failed to produce either one of these responses. The Fc percept is an indicator of a cautious sensitivity to the requirements of other persons; the FC is generally assumed to measure the wish and capacity for emotional rapport. Both measures, therefore, are related to the capacity for making and maintaining adequate adaptations to the social environment. Reference to table 2 shows that 40% of the arrested group, as compared with 73% of the chronic, failed to produce a single Fc response. Also, 40% of the arrested sample, compared with 65.9% of the chronic, failed to give the FC score. A tabulation of the number of persons who fail to produce *both* of these scores shows only 24% of the arrested, but 58.5% of the chronic sample who can be so described.

To take another example, the low Popular percept score (P ≦ 5) is obtained by 58.5% of the chronic group, as compared with 16% of the arrested. Thus, we may state that significantly more chronic patients show a limited ability to share common ways of viewing reality and an inclination to ignore more obvious features of situations. The (A% ≧ 50) score, indicative of stereotypy, is given by 58.5% of the chronic group and 36% of the arrested. Marked stereotypy in the person's range of response is a factor related to the impoverishment of the qualitative productivity of the individual, his adaptive flexibility, and his capacity to achieve rich inner satisfaction. However, if counterbalanced by an adequate awareness of conventional and obvious environmental requirements, such stereotypy need not lead to serious impairment of functioning. When, however, stereotypy is associated with a limited ability to make use of and respond to commonly grasped characteristics of social situations and a diminished capacity to see things as others see them, we may infer a maladaptive inflexibility in the person. The coexistence of the two scores (A% ≧ 50) − (P ≦ 5) thus has different and greater significance than the presence of one or the other; this significance is clearly more than additive. When we look for the frequency of the simultaneous occurrence of these scores, we find that 43.9% of the chronic group, compared with only 8% of the arrested, can be so described. The pattern is one which points to a continuing unsuccessful mode of adjustment.

Both of the patterns discussed above may also be viewed as indices of failures at compensation within the personality structure. In the first instance, more persons in the chronic group fail to compensate a limited wish and capacity for emotional rapport by the development of a sensitivity to the needs and actions of other persons. In the second example, it is markedly more characteristic for chronic patients to fail to counterbalance a stereotyped response repertoire by having a well-developed sense of conventional, socially-accepted behavior.

All 99 of the significant two-score patterns could be elaborated upon in this manner. However, a detailed discussion at this juncture would be possibly redundant for two reasons. The first is that such interpretations will be made below when a further integration of the patterns found in these groups will be presented. Another factor making for redundancy is that a number of the measures represent closely related characteristics.[4]

Certain general hypotheses guided the form of the initial analysis of data. The demon-

[4] Chi-square tests of association, based upon data pooled from both samples, for all the two-variable patterns show that nearly forty of the patterns are measuring significantly associated phenomena. While no detailed presentation of this analysis will be made in this report, it might be pointed out that there are many clusters of Rorschach scores which are all significantly related to each other. Further, a number of the scores are associated with as many as five or more others, suggesting, for this sample at least, a high degree of internal consistency in performance. The Popular response score (P ≦ 5), for example, is significantly related to nine other scores; the Popular score leads all the others in this respect. Each of the following scores is significantly related to the Popular score: Sum c = 0; Sum C = 0; Fc = 0; FC = 0; sum C plus Sum c = 1.5 or less; D = 5 or less; M plus Sum C = 2.0 or less; CF = 0; rejection of one or more cards. This finding is noteworthy because the associated variables are mainly indicators of the interest in interaction with the environment, and of capacity for adequate adaptation to the environment. Confidence in the usual interpretive significance of the Popular score as a measure of ability to share common perceptions of reality and to effectively make use of available features in the environment in coming to terms with it is enhanced by this internal consistency, for the group of associated measures reflect in various ways two general factors which may be designated as "orientation towards emotional interaction with other persons" and "social skills" for such interchanges.

strated group differences in average performance level (table 1) and in frequencies of occurrence of single scores (table 2), as well as the two-score pattern data (table 3) have provided a basis for elaborating upon and integrating the initial hypotheses.

Most of the scores were devised so that they measure some inadequacy in the personality area to which they refer. Not all scores share this characteristic, however. Several of the scores do not represent essentially maladaptive trends; with the copresence or absence of other features, *their significance for adjustive capacity varies.* The scores employed in the proceeding analysis can be considered as belonging to one of the following categories: (1) not essentially maladaptive, considered singly—e.g., (W% $\geqq$ 50), (M% $\geqq$ 14); (2) signs of difficulty which are not, however, preclusive of some capacity for maintaining successful adjustment, e.g., FC = 0, Fc = 0; (3) essentially maladaptive, deficiency in adaptation, e.g., Sum C equal 0, no. Populars $\leqq$ 5.

These categories are clearly continuous, rather than discrete. Nevertheless, it may be of some use to make the distinctions in the further examination of patterns of response. For instance, we may compare records characterized by a number of signs of the second category (lacking many features indicative of successful social adaptation) with records showing a lack of one score, but the presence of other related ones; or we may compare records containing evidence of more basic adaptive inadequacy which either do or do not include compensatory features.

As has been noted above, many of the Rorschach scores measure related features. These interrelationships are demonstrated by chi-square tests of association (see above) and in the group discriminations for two-score patterns shown on table 3. Further, the generally accepted interpretative schema for the various Rorschach scores is one which presumes many of the empirically demonstrable associations. For purposes of concision in communicating the wealth of data, we have selected for presentation in table 4 those patterns which highlight psychological structure and afford the best basis for integrated inferences. A number of significantly discriminating patterns of three or more scores are not shown because it is felt that they add little new information. These unreported patterns describe other possible combinations of the scores, and rather than note all of them, we have decided in general to report those patterns embracing the largest number of separate variables. It ought to be mentioned that confidence may be placed in the data given on table 4; of the unreported tests for significance of patterns, the number which as found to be discriminating was considerably above that which might be expected by chance. The data have been ordered so as to follow the order of the discussion in the text.

We have already briefly discussed the (FC = 0) − (Fc = 0) pattern, noting that significantly more chronic patients fail to produce either of these indicators of capacity for easy social adaptation. The absence of the FC response points to a lack in the ability to integrate the expression of the patient's own feelings with socially appropriate responses; the lack of the Fc score suggests a limited capacity to change and/or to defer actions so that they are in harmony with the requirements of other persons. A record characterized by many responses of the above two types, without accompanying signs of emotional lability, would suggest a certain stiffness in the adaptive pattern. In such a case we might say that the person has renounced too much of his own spontaneity in the interest of "adjustment" conformity. However, some capacity for functioning at this level is desirable and, when absent, indicates that there is likely to be difficulty in relating to other persons in an effective manner. In both these scores, as in many of the other Rorschach variables, we are dealing with a blend of conation and capacity. The interpretation of the absence of both the FC and Fc may therefore be expanded to encompass a lack of a will to adapt. As table 3 shows, 58.5% of the chronic subjects show this pattern (as compared with 24% of the arrested). Table 4 shows that 48.8% of the chronic group, together with (FC = 0) − (Fc = 0), manifest a further sign of poor social adjustment, namely, a low production of Popular responses. Only 8% of the arrested sample yield this three-variable constellation. Thus, in the

TABLE 4.—Patterns of Three or More Scores

	% Chronic	% Arrested	Prob.
(Fc = 0) – (FC = 0) – (P ≦ 5)	47.8	8	.01
(Fc = 0) – (FC = 0) – (A% ≧ 50)	39.0	12	.05
(Fc = 0) – (FC = 0) – (A% ≧ 50) – (P ≦ 5)	31.7	4	.02
(Fc = 0) – (FC = 0) – (D ≦ 5)	33.9	4	.01
(Fc = 0) – (FC = 0) – (D ≦ 5) – (A% ≧ 50)	31.7	4	.02
(Fc = 0) – (FC = 0) – (D ≦ 5) – (P ≦ 5)	36.6	0	.005
(Fc = 0) – (FC = 0) – (D ≦ 5) – (A% ≧ 50) – (P ≦ 5)	26.8	0	.02
(W% ≧ 50) – (P ≦ 5) – (Fc = 0) – (D ≦ 5)	31.7	0	.01
(W% ≧ 50) – (P ≦ 5) – (Fc = 0) – (FC = 0)	29.3	0	.01
(W% ≧ 50) – (P ≦ 5) – (Fc = 0) – (FC = 0) – (D ≦ 5)	26.8	0	.02
(W% ≧ 50) – (Fc = 0) – (A% ≧ 50)	26.8	0	.02
(W% ≧ 50) – (Fc = 0) – (A% ≧ 50) – (D ≦ 5)	24.4	0	.03
(W% ≧ 50) – (Fc = 0) – (A% ≧ 50) – (D ≦ 5) – (P ≦ 5)	22.0	0	.05
(W% ≧ 50) – (Fc = 0) – (A% ≧ 50) – (D ≦ 5) – (FC = 0)	22.0	0	.05
(W% ≧ 50) – (Fc = 0) – (A% ≧ 50) – (D ≦ 5) – (FC = 0) – (P ≦ 5)	19.5	0	.05
(W% ≧ 50) – (Fc = 0) – (FC = 0) – (W minus ≧ 1)	24.4	0	.03
(W% ≧ 50) – (Fc = 0) – (D ≦ 5) – (W minus ≧ 1)	24.4	0	.03
(W% ≧ 50) – (Fc = 0) – (P ≦ 5) – (W minus ≧ 1)	22.0	0	.05
(W% ≧ 50) – (Fc = 0) – (P ≦ 5) – (W minus ≧ 1)	19.5	0	.05
(W% ≧ 50) – (Fc = 0) – (A% ≧ 50) – (D ≦ 5) – (P ≦ 5) – (Rej. ≧ 1)	22.0	0	.05
(W% ≧ 50) – (Fc = 0) – (A% ≧ 50) – (D ≦ 5) – (FC = 0) – (P ≦ 5) – (Rej. ≧ 1)	19.5	0	.05
(W% ≧ 50) – (Rej. ≧ 1) – (R(VIII–X)/R < 30%)	19.5	0	.05
(A% ≧ 50) – (Rej. ≧ 1) – (R(VIII–X)/R < 30%)	29.3	4	.05
(P ≦ 5) – (Rej. ≧ 1) – (R(VIII–X)/R < 30%)	29.3	4	.05
(P ≦ 5) – (Rej. ≧ 1) – (R(VIII–X)/R < 30%) – (D ≦ 5)	22.0	0	.05
(P ≦ 5) – (Rej. ≧ 1) – (R(VIII–X)/R < 30%) – (A% ≧ 50) – (D ≦ 5)	24.4	0	.05
(Sum C = 0) – (Rej. ≧ 1) – (R(VIII–X)/R < 30%)	19.5	0	.05
(Sum C = 0 *or* only pure C) – (Fc = 0) – (P ≦ 5)	43.9	0	.001
(Sum C = 0 *or* only pure C) – (Fc = 0) – (P ≦ 5) – (A% ≧ 50)	29.3	0	.01
(Sum C = 0 *or* only pure C) – (Fc = 0) – (P ≦ 5) – (A% ≧ 50) – (D ≦ 5)	22.0	0	.05
(Sum C = 0 *or* only pure C) – (D ≦ 5) – (W% ≧ 50)	34.2	0	.005
(Sum C = 0 *or* only pure C) – (D ≦ 5) – (W% ≧ 50) – (W minus ≧ 1)	24.4	0	.05
(Sum C = 0 *or* only pure C) – (D ≦ 5) – (W% ≧ 50) – (P ≦ 5)	29.3	0	.01
(Sum C = 0 *or* only pure C) – (D ≦ 5) – (W% ≧ 50) – (Fc = 0)	26.8	0	.02
(Sum C = 0 *or* only pure C) – (D ≦ 5) – (W% ≧ 50) – (A% ≧ 50)	19.5	0	.05
(M% ≧ 14) – (Fc = 0) – (FC = 0)	34.2	0	.005
(M% ≧ 14) – (Fc = 0) – (FC = 0) – (P ≦ 5)	29.3	0	.02
(M% ≧ 14) – (Fc = 0) – (FC = 0) – (P ≦ 5) – (Rej. ≧ 1)	22.0	0	.05
(M% ≧ 14) – (Sum C = 0) – (Fc = 0)	29.3	0	.01
(M% ≧ 14) – (Sum C = 0 *or* only pure C) – (Fc = 0)	36.6	0	.005
(M% ≧ 14) – (Sum C = 0 *or* only pure C) – (Fc = 0) – (P ≦ 5)	29.3	0	.01

arrested group, where there is the lack of Fc and FC, most of these persons are able to produce an adequate number of Populars; the maintenance of the Popular responses may be viewed as a counterbalancing factor in this context. However, it is characteristic for most of the chronic cases to lack this compensating feature. Almost half of the chronic group shows the pattern of limited wish for emotional rapport, a lack of awareness of other needs which controls the form of the individual's reactions, and a diminished ability to share commonly held perceptions of reality. In contrast to the compensation present in arrested cases, we find a reinforcement of the interpretation that the chronic patients are severely lacking in effective adaptive mechanisms.

We also find that the (FC = 0) − (Fc = 0) pattern is accompanied by a high degree of stereotypy in the response repertoire (as this is measured by an A% ≧ 50%) in 39% of the chronic group. This contrasts with the finding that only 12% of the arrested sample are so characterized. It has been previously noted that the pattern of high A%, low number of Popular responses occurs in 43.9% of the chronic cases, as compared with only 8% of the arrested. This pattern has been interpreted as signifying a maladaptive inflexibility. If we examine the incidence of the four-variable configuration of (FC = 0) − (Fc = 0) − (A% ≧ 50%) − (Pop. ≦ 5), we find that 31.7% of the chronic sample, and only 4% of the arrested, are described by *all* of these scores.

The number of large detail responses in a record is somewhat related, in interpretive significance, to the number of Popular responses. An adequate number of D responses is generally considered to indicate that the subject is capable of grasping the more obvious, practical and concrete aspects of situations. Since this factor is psychologically related to the other measures of adaptive skills, we looked for its appearance in configurations containing these other measures. As table 4 shows, 43.9% of the chronic group show the pattern of (D ≦ 5) − (FC = 0) − (Fc = 0) in contrast with only 4% of the arrested sample. Most of these cases also show a limited production of Popular responses; 36.6% of the total chronic sample produce the four-score constellation (P ≦ 5) − (D ≦ 5) − (FC = 0) − (Fc = 0), while *no* arrested case yields it. The underproduction of D responses seems related to the preference in the chronic group to approach situations globally; this factor will be elaborated below. However, it might be pointed out here that the combination of a low D and low P score suggests that chronic patients tend to have limited ability to make use of the available and obvious environmental characteristics. Further, this tendency is accompanied by the scores indicative of lack of wish and capacity for those personal relationships in which emotion is expressed in a reality-regulated manner in more than a third of the chronic sample. None of the arrested cases shows a deficiency in all of these aspects of adaptation.

Adding the A% score, a measure of an impoverished range of interests and of rigidity in the associative processes, we find that 26.8% of the chronics are described by the constellation of all five scores: (A% ≧ 50) − (P ≦ 5) − (D ≦ 5) − (FC = 0) − (Fc = 0). Again, no arrested cases can be so characterized.

To sum up the discussion to this point: We have noted that five separate scores, all related to various aspects of effective adaptation, discriminate between the chronic and arrested groups. For each of these measures, the direction of difference has been one that points to a lack of deficiency in the chronic group and the presence of capacity in the arrested group. Reference to table 2 will show that more than one-third of the arrested group are described by three of the five scores, when they are considered *singly*. The data in table 3, reporting the two-score patterns, clearly demonstrate a reduced overlap between the groups. As we increase the number of scores included in a pattern, the overlap reaches the zero point for this group of scores, considered as a *group*. The psychological significance of this phenomenon appears to be this: in arrested subjects, a deficiency in one aspect of adaptational effectiveness is compensated for by an adequacy in other aspects. However, there is much less of this counterbalancing in the performance of chronic patients; indeed, the absence of *many* desirable features is only partially describable as lack of compensatory mechanisms. For pa-

tients showing deficiency in three, four, or five of the areas, we may also speak of a lack of appropriate, smoothly-functioning mechanisms for adjustment; and in certain extreme cases, a defenselessness. Patients showing most or all of these deficiencies may be said to lack ordinary capacity for easy social relationships, to be insufficient in perceiving reality in the same terms as others, and to have little social sensitivity and wish for emotional rapport.

Further, within such a constellation the maintenance of adaptive behavior would probably involve considerable conscious effort and tension.

In introducing the D score into this discussion, we enter into a consideration of the formal characteristics of the subject's approach to the Rorschach stimuli. A basic premise underlying the interpretation of the location determinants is that the mode of organization of the responses to the Rorschach is reflective of a general disposition to respond to situations and persons in an analogous manner. Going back to table 2, we note that 46.3% of the chronic patients produce a percentage of whole responses that is one-half or more of their response total. In contrast, only 12% of the arrested show this preference for percepts which encompass the entire blot. The preference for responding to the total blot is highly related to the underproduction of large detail percepts in the chronic group. We find that 39% of this sample yield the pattern of a high W% and low number of D; no arrested case gives this pattern (see table 3). Thus, the hypothesis is suggested that chronic subjects tend to approach situations globally and do not prefer to break down situations in terms of certain obvious and practical features.

Further examination of the two-score patterns reported on table 3 shows that the W preference is accompanied by the complete absence of the Fc percept in 39% of the chronic sample; again, no arrested subject is so characterized. The high W% is associated with an absence of the FC response in 36.6% of the chronic, in comparison with only 4% of the arrested cases. Also, the high W% is accompanied by a relatively low number of Popular responses in 31.7% of the chronic group, contrasting with the finding that only 4% of the arrested sample show this combination. From these findings we may infer that the preference for responding to all aspects of the stimulus field is related in part to an inability to make alternative and more differentiated responses. The tendency to produce many Whole responses indicates that there is a disposition to respond to the characteristics of a situation in an all-encompassing manner. However, if we are to infer that this interest in organization is indicative of an adaptive, reality-oriented integration, there should be other signs in a record establishing the adequacy of the total organization. As we have just seen, this is not the case with the chronic subjects who show this W preference. These patients fail to produce evidence of capacity for caution and adaptation to others; they also show a deficiency in their ability to see situations as others see them. Table 3 shows that 31.7% of the chronics show marked stereotypy (as measured by the high A%) together with the high W%. Instead of elaborating further upon these findings for two-score patterns, let us examine table 4 to see whether these variables actually occur in larger patterns with significant frequency.

We find that 31.7% of the chronic cases yield the entire constellation of (W% $\geqq$ 50) $-$ (Fc = 0) $-$ (P $\leqq$ 5) $-$ (D $\leqq$ 5). Nineteen and five-tenths per cent produce the entire pattern of 6 scores: (W% $\geqq$ 50) $-$ (Fc = 0) $-$ (A% $\geqq$ 50) $-$ (D $\leqq$ 5) $-$ (FC = 0) $-$ (P $\leqq$ 5).

Several other configurations of W% and the group of scores we have termed indicators of adaptive effectiveness are also presented on table 4. It may be seen that not a single arrested case produces any of these patterns involving three or more scores. These patterns allow for an empirical demonstration of the hypothesis that the preference for whole responses among a subgroup of chronic subjects is highly related to their lack of socially appropriate adaptive mechanisms. The constellation may be interpreted as follows: This subgroup of chronic patients is lacking in ability for easy emotional rapport with others, is deficient in the ability to delay expression of impulses, is limited in grasping the obvious and socially shared aspects of situations, and show an inflexibility of the associative processes. In this context the W preference would

seem to point to a diffuse undifferentiated response to stimulation from the environment.

We have already noted that the incidence of one or more Whole responses which do not conform adequately to the stimulus characteristics of the blots (W−) does not significantly differentiate the two criterion groups although there is some trend for more chronic subjects to produce responses of this type (58.5% vs 48%). It was theorized that the significance of the (W−) score would depend in part upon to what degree the individual relied upon a W approach: the hypothesis advanced here is that for persons who approach most situations globally, the breakdown of reality testing indicated by the (W−) is suggestive of greater difficulty in adaptation than for persons who have alternative modes of approaching problems and social situations at their disposal. Comparing the incidence of one or more W− responses in records characterized by 50% or more Whole responses, we find a significant difference between the two groups. Thirty-one and seven-tenths per cent of the chronic, versus only 4% of the arrested cases, show this pattern ($P = .02$). Table 3 shows that over a quarter of the chronic group produces this pattern together with each of the following scores: absence of Fc; absence of FC; low number of D. Further, 22% of the chronic group show an accompanying low number of Popular percepts. None of these constellations of high W%, production of W− and lack of one of the "effective adaptation" scores is shown by a single arrested case. Reference to table 4 again demonstrates that patterns encompassing three or more of the characteristics are obtained with a frequency beyond chance expectations in the chronic group, and *exclusively* in that group. The four-score pattern of (W% ≧ 50) − (W minus ≧ 1) − (Fc = 0) − (D ≦ 5) appears in 24.4% of the chronic cases. If we add the low number of Populars to this constellation, we find that 19.5% of the chronic patients produce all five scores: (W% ≧ 50) − (W minus ≧ 1) − (Fc = 0) − (D ≦ 5) − (P ≦ 5). The addition of the W − score to the tabulation of patterns of responses thus adds the following new information to our description of personality structure in chronic tuberculosis patients: a subgroup exclusive to the chronic sample manifests a trend toward diffuse and global perceptions of reality associated with a lack of available mechanisms for adaptive and psychologically efficient adaptation, and, on occasion, severely poor judgment in their global appraisals of situations.

We will return to an empirical description of additional attributes related to the (W% ≧ 50) − (W minus ≧ 1) cases when we discuss the Rorschach scores dealing with affectivity in a succeeding section.

At this juncture some other findings which are associated with the W preference might be presented. We have shown that the patterns associated with the W% in the chronic group suggested the interpretation that these subjects did not have available alternative modes of response. We may also note that 26.8% of the chronic sample show the inflated W% together with failure to respond to one or more of the ten cards (see table 3). No arrested case produced this pattern. We have already examined the data for the frequency per card of rejection or failure to respond and noted that cards IX and X show the greatest incidence (see above). Card IX, with its diffuse colors and forms, is generally the most difficult for most subjects. However, card X is infrequently failed by normal subjects; one of its most distinctive characteristics is the difficulty it creates for the formation of a Whole response. Eight of the 11 cases with the (W% ≧ 50) − (Rej. ≧ 1) pattern reject card X. These findings suggest that for a subgroup of the chronic subjects, where they cannot form a Whole percept, they fail to produce any response.

The W preference score in the context of failure to respond to one or more cards is also accompanied by the entire group of scores we have termed measures of "lack of available mechanisms for adaptive effectiveness" in 19.5% of the chronic group; again we find that no arrested case may be so described. Card X is rejected by all but two cases in this subgroup, showing a common configuration comprising seven separate scores: (W% ≧ 50) − (Fc = 0) − (A% ≧ 50) − (D ≦ 5) − (FC = 0) − (P ≦ 5) − (Rej. ≧ 1). These patients may be said to respond diffusely to situations, to be incapable of other more refined reactions, and to fail to respond at all if the preferred global approach is ruled out by

the discrete structure of a confronting environment. This holds true despite the fact that the stimulus situation in card X is one in which obvious, well-segregated details exist, and where a number of the details are readily perceived (with Popular-Animal content) by most normal subjects. The difficulties of the stimulus situations such as card X presents must then be very great for this subgroup of chronics: one of the scores in the pattern is a percentage of Animal responses equal to one-half or more of the total response number. Thus, despite this fixing upon Animal content, card X with its several Popular-Animal forms is still rejected.

Another score which is given together with the high W% is R(VIII–X)/R under 30% (see table 3). This latter score is assumed to be a measure of a tendency to withdraw or at any rate to be less responsive when confronted with strong emotional stimulation from the environment. Twenty-two per cent of the chronic cases (versus a zero incidence for the arrested) may be described as evidencing both a tendency to react globally to stimulation, together with inhibition when faced with intense affective arousal.

Table 4 indicates that 19.5% of the chronic group exhibit the constellation of (W% $\geqq$ 50) $-$ (R(VIII–X)/R $<$ 30%) $-$ (Rej. $\geqq$ 1). We may describe this pattern as indicative of a predisposition toward an all-encompassing reaction to stimulation together with sporadic refusals to respond at all (especially when a differentiated, concrete approach is required for response) and an under-responsiveness specifically in situations involving emotional display from others. This latter characteristic may be considered as reflecting an affect-shyness or contact-shyness. All but one of the cases in this group have a failure of response for card X.

Up to this point we have focused upon the evidence with regard to the possible cause for the failure to respond to card X, namely, the problem it presents for persons who prefer to give whole responses. We have also noted the high incidence in the chronic group of failure for card IX, and their general reduced productivity for the last three cards of the series, all of which are brightly colored.

Referring back to table 2 we see that 43.9% of the chronic group show this inhibition of responses to the last three cards; in comparison 20% of the arrested sample give less than a proportionate number of responses to cards VIII–X. Table 3 offers the further information that 39% of the chronic cases show this sign of what we have termed affect-shyness together with marked inflexibility (R(VIII–X)/R $<$ 30%) $-$ (A% $\geqq$ 50%). Only 8% of the arrested subjects have both these characteristics. This finding is worthy of more emphasis: Again, despite the stereotypy of the associative content (the object of the stereotypy being animals forms), chronic cases manifest a diminished responsiveness to the last three cards which among them offer six different large detail *Popular Animal* response possibilities (and including a much wider range of possible specific content). Thus even with the tendency to search for animal forms, chronic patients more frequently have difficulty in producing an adequate number of responses to cards VIII–X. It would appear that the intense color (in addition to the W preference discussed above) is an important factor making for the inhibition.

Twenty-nine and three-tenths per cent of the chronic subjects produce a three-variable pattern described by (A% $\geqq$ 50%) $-$ (R(VIII–X)/R $<$ 30%) and rejection of one or more of the blots. Only one arrested case yields this pattern. We may interpret the structure of scores as follows: Almost one-third of the chronic patients manifest marked constriction in their range of associations, but even the stereotyped response is inhibited when they have to cope with strong affective stimulation. The mode of "coping" adopted would seem that of withdrawal, of limiting or completely withholding response.

One other score which accompanies both the reduced productivity to the last three cards and the failure to respond to one or more cards is (P $\leqq$ 5). Table 4 shows that 29.3% of the chronic, compared with only 4% of the arrested, produce the pattern (R(VIII–X)/R $<$ 30%) $-$ (Rej. $\geqq$ 1) $-$ (Popular $\leqq$ 5). This constellation indicates that both the inhibition of response in the face of emotional stimulation and the sporadic complete refusal to respond are related to a limited ability to participate in socially-shared perceptions of reality. The one arrested case who showed this

pattern did, however, produce other compensating features, among them an adequate number of D (indicative of capacity to grasp the practical and concrete aspects of situations).

It may be noted that 24.4% of the chronic group produced the pattern (R(VIII–X)/R < 30%) – (A% ≧ 50) – (P ≦ 5) – (D ≦ 5), while no arrested subject did so. This finding suggests the following propositions which apply exclusively to the chronic patients and describe one-fourth of the group: We are dealing with a personality structure described by marked inflexibility of reactions. The type seems to be unable to utilize fully the readily available and commonly grasped aspects of reality. Individuals in this classification would appear to be particularly immobilized by situations with strong emotional charge. What this configuration suggests to the authors is the hypothesis that a basic affective disorder is dynamically related to the characteristics described above. Further evidence which lends confirmation to the validity of the interpretation of the restricted response to cards VIII–X is the fact that 36.6% of the chronic group show this restriction together with a failure to produce even a single CF response. Only 4% of the arrested sample have both these scores. The CF score is generally assumed to reflect some depth in the affective experience of the subject. The lack of this score in the context of the inhibition under emotional stimulation offers further insight into the affective structure found in many of the chronic cases. We will next proceed to a direct examination of the color responses and the configurations in which these responses appear. As Rapaport states, "... the subject's use of color appears to reflect his handling of affects, impulses and actions." (p. 224, 56).

We have shown that the traditional assessment of emotional stability, based upon the predominance of form-controlled color percepts over other types of color responses, failed to discriminate between the criterion groups (see table 2a). Indeed, less than one-third of the arrested subjects show a balanced distribution of the types of color responses. If, instead of searching for a quantitative balance, we seek to ascertain the simple presence of adaptive or relatively adaptive response characteristics and the absence of maladaptive ones, we can report the following data:

	Chronic	*Arrested*	*Chi-square*	*P*
% giving *only both* (FC and CF)	7.3	40.0	8.5	.005
% giving only FC or only both (FC and CF)	9.8	44.0	8.5	.005
% giving only FC; only CF; or only both (FC and CF)	14.6	60.0	12.7	.001
% giving no color responses	39.02	8.0	6.1	.02
% giving *only* pure C	17.1	4.0	—	—

From the above, it may be seen that 40% of the arrested sample produce both FC and CF responses, and only these types. These 40% do not give any pure C responses in their records. Rorschach proposed that the FC score be taken as representative of "that emotional instability ... basic for the ability to achieve emotional rapport and to make emotional approach to the environment." (p. 33, 58). The CF response, as we have noted in a preceding paragraph, is a measure of the intensity and spontaneity of affect. While the CF response is not as reality-oriented as the FC response, it does reflect the *desire* for adaptation. Of the pure C response, Rorschach states that "here the desire for adaptability has been extinguished." (p. 99, 58). Only 7.3% of the chronic subjects show the characteristics: FC and CF both present, with no pure C given.

We further note that 60% of the arrested sample produce color responses which are only of the CF and/or FC type, as compared with but 14.6% of the chronic sample who can be so described.

Since almost two-fifths of the chronic sample fail to produce a single color percept, the data below indicate group differences when the population base is only those subjects who give at least one color response:

	Chronic (N = 25)	*Arrested* (N = 23)	*Chi-square*	*P*
% giving only both FC and CF	15.0	43.5	4.5	.05
% giving only FC or only both (FC and CF)	20.0	48.	4.3	.05
% giving only FC; only CF; or only both (FC and CF)	24.0	65.0	8.3	.005

Although the group differences are somewhat reduced when we include only color-users, they are still maintained beyond chance expectations.

We have just referred to the finding that 39% of the chronic group, as compared with only 8% of the arrested, produce no color responses in their records. The total absence of color responses is generally taken as evidence for inferring a rigid repression of affect and lack of emotional investment in interpersonal relationships. Table 3 shows that this factor is associated with the Rejection score; 29.3% of the chronic group (but no case in the arrested) may be described as rigidly constricted affectively with the tendency to fail to respond at all to problem situations. Table 4 indicates that 19.5% of the chronics (and, again, no arrested case) manifest the three-variable pattern: (Sum C = 0) − (Rej. ≧ 1) − (R(VIII-X)/R < 30%). The personality structure indicated by this configuration is one characterized by marked turning away from emotional exchange with other persons.

The pure C response has been given a number of interpretations by leading Rorschach workers. Rorschach spoke of this score as representing "the tendency to impulsive emotional discharge," extreme irritability, and in certain patients, emotional and associative scattering, and irresponsibility—in addition to its significance as an index of the extinction of desire for adaptation which has previously been cited. Rapaport speaks of the pure C response as an index of ego-centricity in the extreme, and of the "abandonment of control over affects and actions." He also states that under certain conditions the score may represent a "generalized inappropriateness or flattening of affect." (56, p. 254). Rapaport, however, does not offer his opinion as to the nature of the conditions under which one may proceed to make this interpretation. There does seem to be a common denominator to all the interpretations cited: the pure C is clearly a response which does not take into account reality factors; the affect expressed by this score is not directed in an adaptive way toward other persons. Perhaps one of the conditions under which it would be correct to interpret the pure C score as representing a dulling or flattening of affect is when it is the *only* type of color response produced in the record.

Reference to table 2a shows that the incidence of the pure C response does not differentiate the two groups (39% of the chronics and 36% of the arrested have at least one pure C in their protocols). However, if we turn our attention to those cases whose *only* color production is the pure C, we find that 17.1% of the chronics in distinction to 4% of the arrested can be so described. Although this finding misses statistical significance, the anticipated trend is apparent.

It appears that the significance of the pure C, when it is the only type of color percept the subject is able to give, is somewhat similar to that given to the complete absence of color responses. The common factor to these two types of scores is the lack of socially-directed and adapted emotion. In interpersonal situations, persons characterized by either of these scores would be unable to engage in gratifying interaction. When we sum up the data for these two scores (Sum C = 0) *or* (only pure C), we find that 56.1% of the chronics show this complete lack of adaptive affect in interpersonal situations, while only 12% of the arrested group show either of these signs. In the succeeding presentation of patterns of scores associated with this complete absence of socialized affective discharge, cases showing only pure C will be added to those showing complete absence of color responses.

In table 3 we saw that 36.6% of chronic group produced the pattern (Sum C = 0) − (Fc = 0), compared to 4% of the arrested. We may infer from this pattern that the affective withdrawal is not compensated for by a sensitivity to others in the interest of self-protection. The kind of adaptation indicated by the Fc percept may perhaps be distinguished from the FC on this basis: the FC represents adequate rapport that is a function of genuine affective investment in the other person; the Fc would seem to reflect a kind of caution in action that is motivated rather by the needs for defense. The Fc then represents a mode of adaptation which may be "successful" in that it may make for at least a surface adjustment. Now if we add the cases who produce "only pure C" to the group who gave no color responses and no Fc, we find that 51.2% of the chronics show the *lack* of compensation for the inability to make genuine emotional ties with the environment by the development of tact

and cautious sensitivity. Only 4% of the arrested yield this pattern. The probability that such differences could have arisen by chance is only one chance in a thousand.

An adequate number of Popular responses is reflective of another "mode of adaptation" which can have at least a superficial effectiveness. We find that 46.3% of the chronic group show the following pattern: (Sum C = 0 *or* only pure C) − (Fc = 0) − (P ≦ 5) (see table 4). No arrested cases show this configuration. Thus the great majority of the chronic cases who show the extreme emotional constriction (56.1% of the group) fail to compensate for this lack by adequate capacity to function at a superficial level in a relatively easy and conventionally appropriate manner.

Two additional patterns are presented in table 4 which enlarge upon the interpretation just outlined. As we increase the number of variables included within a given configuration, there is a decrease in the percentage of the chronic group who can be so classified. However, one gain of this larger pattern is that it provides a firmer empirical foundation for interpretations than the single score or the pattern embracing fewer scores. The configuration (Sum C = 0 *or* only pure C) − (P ≦ 5) − (D ≦ 5) − (Fc = 0) − (A% ≧ 50) occurs in 22% of the chronic group, and has a zero incidence among the arrested. Thus within the context of severe affective withdrawal, we find a subgroup who shows *all* the scores which form the core of what we have termed indices of lack of available and effective mechanisms of adaptation.

Also associated with the highly constricted emotionality is the global approach to stimulation with a deficient interest in and attention to the tangible and practical. Twenty-two per cent of the chronic subjects have the pattern of (Sum C = 0) − (D ≦ 5) − (W% ≧ 50). If we add the patients whose only color response is pure C, we find that more than a third of the chronic group fit the general description that has been just outlined. Although 12% of the arrested group show one or the other of the constricted affective organizations which we regard as psychologically equivalent, no one of these cases has *any* of the accompanying maladaptive patterns which occur with a frequency beyond chance expectations among the chronic patients. In short, the few arrested subjects who have severe problems in establishing and maintaining affective relationships are nevertheless fairly-well integrated and capable of effective reality-testing.

Several other scores enter into response constellations which have as a common core the (Sum C = 0 *or* only pure C) − (D ≦ 5) − (W% ≧ 50). For example, 26.8% of the chronic sample show both the (P ≦ 5) − (Fc = 0) scores *along with* the former group of three scores (see table 4). This five-variable pattern offers a broad base for making integrated inferences as to the underlying personality structure. What it suggests is the proposition that this subgroup of chronic patients has "burned-out" its affect; the lack of orientation to persons and to the concrete details of living, which are attended to by most other persons, points to severe apathy and the absence of even the wish for positive goals. They have very limited capacity to counterbalance deficiency in one adaptational sphere by adequacy in another. One might state that patients with personality structures such as this are virtually defenseless and helpless.

We have emphasized the pattern of emotional constriction and the turning away of interest from the environment. As yet, however, we have not discussed the findings for the introversive features in the two criterion groups, except for noting that the human movement response (M) has not undergone the general inhibition in the chronic group. As is shown on table 2, relative to the total productivity, there is a trend for higher production of M responses among the chronic subjects; 46.3% of the group have an M% which falls within the upper third of the pooled distributions. The low threshold for perceiving M is also shown by the fact that more chronics see humans in motion in the first two cards of the series (M I–II). (see table 2 and the discussion immediately following it).

Table 3 indicates that the relatively high production of M responses is associated with a number of other scores which form the core of the lack of "adaptive skills" group (e.g., (Fc = 0), (FC = 0), (P ≦ 5)). Table 4 shows that the marked introversive trend is accompanied by *several* of such scores in the chronic sample with a frequency beyond chance. One such pattern exclusive to the chronic sample (M% ≧ 14) − (FC = 0) − (Fc = 0) de-

scribes 34.2% of the chronic group. If the (P ≦ 5) score is added, we find 29.3% of the chronics showing the four-variable configuration. Such a configuration suggests the hypothesis that the introversive features in this subgroup are not being utilized for adaptive purposes; the trend toward inner living occurs most frequently in persons with limited capacity or desire for emotional rapport, who lack social sensitivity and who are deficient in their capacity to share conventional views of situations.

As is shown on table 4 the Rejection score enters into this pattern (M% ≧ 14) − (Fc = 0) − (FC = 0) − (P ≦ 5) − (Rej. ≧ 1) in 22% of the chronic cases. It would seem that persons with such limited wish and capacity for social relationships, and who sporadically will not respond when situations cannot be coped with in preferred fashion, can be described as somewhat negativistic; persons who are focused upon their own inner thoughts in this context would seem somewhat intractable to the ordinary social demands made upon them by others.

Table 4 shows that the pattern (M% ≧ 14) − (Fc = 0) − (Sum C = 0) described 29.3% of the chronic group. Such persons are introverted and lack the capacity to voluntarily turn toward other persons in an emotionally meaningful way. The complete restriction of outer-directed affect together with the absence of a developed compensatory sensitivity to other persons suggests a rigid quality to the introversion, with the likelihood of autistic trends. If we add the cases whose only color production is the pure C, we find 35.6% of the chronic group can be so described. Rorschach proposed that the pattern of a number of M responses together with pure C percepts might be taken as indicative of a basically introversive personality with extreme potential impulsivity; only conscious control can stabilize emotional expression, and "when an impulse is released in such a person, it explosed the confines of his introversive stabilization. . . ." (56, p. 101).

We also find that 29.3% of the chronic group show the entire pattern (M% ≧ 14) − (Sum C = 0 *or* only pure C) − (Fc = 0) − (P ≦ 5). The coexistence of the limited number of Populars score with the above lends more weight to the interpretation that we are indeed dealing with persons who are really turned inward upon the self, and who have little interest in either persons or events in the environment. Further they would not appear to be capable of successful interactions because of their limited social skills and inability to make real emotional investments.

One other finding might be mentioned at this point. We found that 53.7% of the chronic group, in contrast to 16% of the arrested sample, show one or both aspects of the Experience Balance equal to zero. Actually there were only four cases in the entire group of subjects, and all of these were chronics, who showed an absence of both the M and Color response. Capacity for both introversive and extratensive experience is generally required if the person is to be capable of empathic experience with other persons. Yet more than one-half of the chronics show a lack of one of these features; as is evident from the data, more frequently the deficit is in the area of outer-directed trends.

There were 10 chronic and three arrested cases who showed no M. We examined the pattern of the extratension scores in order to determine whether the individual showed counterbalancing strength to compensate for the lack of introversive capacity. Of the 10 chronic subjects with no M, four had no color responses either, three produced only pure C responses, one had 1 FC and 1 C, one only 1 CF, and one (a female) had 1 FC, 1 CF and 1 C. Thus seven of the 10 have no sign of capacity for emotional relationships which might compensate for the poverty of the inner life. In contrast, of three arrested cases with no M, one has 2 FC and 1 CF, one has 2 FC and 3 CF, and one has 1 CF. Thus, in varying degree, all of these three show some ability or desire for emotional relationships with others.

There is another aspect to the Rorschach data which has not yet been discussed, namely, the analysis of the contents of the movement responses. We have shown that the chronics seem to be more oriented toward perceiving human movement than the arrested subjects. This has been demonstrated by the findings with regard to the frequency of cases who show an M% which falls within the upper third of a pooled distribution, by the greater incidence

of M responses to cards I and/or II, and by the significantly lower average rank initial reaction time to card II. We predicted that the contents of the movement responses would involve aggression more frequently in chronic cases than in the arrested. This is in line with the general hypothesis that the individual tends to project upon stimuli such as the Rorschach those behaviors which he is unable to express fully. The method of analysis adopted for investigating this prediction was as follows: The movement contents were coded along a four-point scale which was labelled as "object interaction", ranging from humans in action without any object involved (step one), humans in action holding or carrying some object (step two), humans involved in effortful relationships to objects, e.g., reaching out, lifting (step three), to humans involved in struggle over objects, e.g., pulling, tugging, grabbing (step four). For each individual record, the scale value of most active kinesthesis (if more than one was produced) was utilized for assigning a score. Examining the distributions along these scale steps revealed a trend for arrested cases to be characterized more frequently by steps one and two (no effort or struggle in interaction) and for chronic cases to be described by steps three and four (involving effort or aggressive struggle with others over objects). Hence we dichotomized the scale and scored subjects as either producing or not producing the M-contents described in steps three and four.

Taking the total sample for each group as the population base, we found that 28% of the arrested and 48.8% of the chronic group were scored for M responses falling into steps three or four. This finding misses statistical significance; however, it includes cases who did not produce any M responses at all. If we recompute the group differences with a sample base of individuals who gave at least one M response (21 arrested subjects, 31 chronic subjects), we achieve a discrimination which is beyond chance fluctuations: 33.3% of the arrested, and 64.5% of the chronic subjects perceive struggle in the object interactions depicted in the human movement responses. Examples from the protocols of responses which were scored in steps three or four are: "two people, both grasping at the same object"; "two people trying to grab something from each other"; "they're pulling away on something"; "trying to hold on to something".

Some further leads as to the significance of this finding may be found by reference to table 3. Here we see that 24.4% of the chronic group show the pattern of M content of this struggling or hostile nature together with the Rejection of one or more cards; 22% of the chronics show such M content in the context of a limited number of Popular responses; 22% show this M content with a low number of Large detail responses. No arrested case shows any of these two-score patterns. Actually the percentages are greater if we again use only those cases who gave at least one M as the base for computation: we find that 32% of the chronics show the pattern (Rej. $\geqq$ 1) $-$ (M content); 29% show the pattern (P $\leqq$ 5) $-$ (M content); 29% show the pattern (D $\leqq$ 5) $-$ (M content).

We also find that 22% of the total chronic sample produced the constellation of (M content) $-$ (M% $\geqq$ 14) $-$ (Sum C = 0 *or* only pure C), a pattern which again is exclusive to this group. (If we use only subjects who give at least one M as the population base, we would describe 29% of the chronic group.) We have already proposed that the (M% $\geqq$ 14) $-$ (Sum C = 0 *or* pure C) pattern is suggestive of autistic trends, of a turning away from the environment as a source of gratifications. The copresence of the type of projected movement we have described in steps three or four of the content scale would add the hypothesis that basic to this turning away from others is a perception of the environment as a place of limited values. Achievement of satisfactions is seen as a struggle; other persons constitute threats to the person's own gratification, and if there is to be gain, it is seen as effortful or actually requiring an aggressive tug-of-war with others. The tendency to refuse to participate (measured by the Rejection trend) is perhaps one reaction to such a perception of the world. Further, the limited ability to perceive reality in conventional terms is perhaps dynamically a function of this perception of the world as a place of scarce values.

Actually 19.5% of the total chronic group (and 26% of those giving at least one M) show the constellation of (M content) $-$ (Sum C =

0 *or* only pure C), (P ≦ 5) — (Fc = 0). This pattern, exclusive to the chronics, indicates that the lack of socially-directed affect, the limited social sensitivity and sharing of common views are related to the effortful or aggressive attitudes toward objects. The writers advance the view that the world-view indicated by the M contents is basic to the lack of socially appropriate mechanisms and desire for interpersonal relationships; however, it seems clear that there may be a circularity to this interrelationship.

Earlier in this report we noted that one of the outstanding Rorschach performance differences between the chronic and arrested samples was the Response total. It might be held that a number of the observed performance differences are functions of the lower response total in the chronic group. It is an empirical problem to determine which scores in fact are "associated" with the general level of productivity; it is an interpretative one to evaluate the meaning of any such associations. The law of parsimony, if invoked in relationship to Rorschach data, might at times lead to over-simplification of the observations and to the loss of fruitful inferences that one might draw from observed performance differences between criterion groups.

We have reported the observation that there is a distinctly lower productivity level among the chronic patients as well as a greater tendency to reject stimulus material. The writers posit that this restriction of response is a meaningful and selective process, only inadequately clarified by regarding "responsiveness" as a most basic explanatory principle. We investigated all the scores which were found to distinguish between the groups in order to assess the degree of association of each score with the general level of productivity. The results of this analysis support the contention that there is a selective inhibition of certain types of responses. Perhaps we may also, in the context of a generally lowered productivity, speak of a selective emphasis of certain other types of responses.

The first method used for evaluating the Response total factor was that of dichotomizing the chronic group into the categories of subjects with R = 10 or less and subjects with R = 11 or more. We found the following scores to be independent of Response total: (W% ≧ 50); (A% ≧ 50); (FC = 0); (CF = 0), (Dd plus Dr = 0); (M% > 14); (M to cards I or II); (M content); (Fc = 0). The scores (Sum C = 0) and (R(VIII–X)/R < 30%) also showed independence of the response total, but only if we base the data exclusively upon the male subjects. This finding will be returned to when we note the sex differences in test performance.

With the remaining scores, which were statistically related to response total in the chronic group, we adopted another method for evaluating *whether the obtained group differences* were to be regarded as highly dependent upon this factor of response level. The procedure was to drop those cases with response total of 10 or less and then re-test for group differences. We found that the (Rejection = one or more), (D ≦ 5), and (P ≦ 5) scores still distinguished between the arrested and chronic subjects. Thus we may say that though these last three scores are significantly associated with response total, if we rule out cases with Responses below 10, we can still find significant group differences.

The remaining scores, which are all related to response total, and which no longer distinguish between the groups when low response subjects are eliminated, are: (Sum c = 0), (FM = 0), (Sum C plus sum c = 15) and (EB ≦ 2).

In sum: there is a clear trend for subjects with Response total equal to 10 or less to have, relative to subjects with more responses, a higher incidence of the various scores which were found to differentiate the criterion groups. However, the majority of the scores have been shown to be statistically independent of response total. As may be recalled, there were three methods for dichotomizing scores: zero incidence versus one or more of a given type of response, percentage at or beyond a given level, and the meeting or falling above or below conventionally established norms. These modes of codification of scores are such that the dependence of a particular score upon the number of responses is minimized. In completing this discussion of the significance of the Response total, it may be of interest to note that Rorschach felt that the "number depends principally on emotional rather than associative factors. Depressed, sullen or unobliging

subjects often give less than the average number of answers." (58, p. 21).

Sex differences. Although the number of female cases in this study is too small for refined statistical evaluation of sex differences, there are several features which seem to be distinctive for the chronic females. The arrested females did not show any clear-cut differences from the arrested males in their performance characteristics. However, a number of scores which differentiated the criterion groups did not occur in *any* of the chronic females. No chronic female showed a Response total of 10 or less, nor rejected any of the cards. Further, no chronic female showed an absence of all color responses, or a reduced productivity to the last three brightly colored cards. We might interpret this as suggesting that the tendency to withdraw from affective involvements and the limited productivity are characteristics of male chronic patients. It is also obvious that no chronic female is described by any of the patterns involving the (Sum C = 0), (R(VIII–X)/R $<$ 30%) or Rejection scores.

Age differences. There were no significant differences for the various scores or patterns in relationship to the age factor. A trend worth noting, however, is that the group of chronic males over 50 more frequently shows an absence of CR and a high production of W responses.

B. Drawing data

Two figure drawings were requested of all subjects included in this study. Nine male chronic patients refused to produce any drawings, while all arrested subjects complied with the request. The major findings for figure drawings are summarized in table 5.

TABLE 5.—Summary of Results from Figure Drawings

	Mean Chronic (N = 22)	Mean Arrested (N = 20)	t	P
(Subjects drawing more than ½ figure) Average				
Goodenough score (47 items)	23.5	34.1	3.5	.001
Basic proportion score (20 items)	12.1	16.2	2.54	.02
	% Chronic (n = 22)	% Arrested (n = 20)	X^2	P
Absence of eye detail beyond circle or dot	59.1	15.0	6.8*	.01
Absence of hair detail beyond scribbled depiction	72.7	30.0	6.8*	.01
No, or limited clothing	81.8	40.0	6.1*	.02
	(n = 28)	(n = 24)		
"Primitive" drawing plus W% $\geq$ 50 in Rorschach	40.9	5	5.6*	.02
"Primitive" drawing (W% $\geq$ 50), (Fc = 0) in Rorschach	40.9	0	8.1*	.01
Absence of hands and/or arms (based on drawings which included at least head and shoulder depiction)	50.0	21.0	4.8	.05
	(n = 30)	(n = 23)		
Lack of any sexual differentiation between the male and female drawings	40.0	17	n.s.	
	n = 30	n = 23		
Passive, purposeless, or complete lack of activity in associations				
(Figure I)	63.3	26.1	7.6	.01
(Figure II)	64.3 (n = 28)	30.4	5.8	.02

* Corrected for small theoretical frequencies.

The Goodenough criteria for evaluating figure drawings were adopted in order to quantitatively assess group differences in the drawing. Fiedler and Siegel (23) have reported that they found the Goodenough scale useful as a predictor of non-improvement in psychotherapy. An examination of the criteria indicates that in order to reach a high score the subject must be capable of planning the whole production and selecting essential characteristics; he must make judgments of relative proportion and continuously re-adapt to the task as new features are added. By adequately representing a recognizable person, the subject shows a capacity for sustaining activity and an interest in details of required performance. Forty-seven items were used in this evaluation. Only those subjects who produced more than one-half of a figure were scored; subjects who produced only a head, or head and shoulders, were eliminated from this analysis because such drawings would be unscorable for the various omitted details.

Twenty-two chronic and 20 arrested subjects produced figures which attempted to portray the whole figure, or nearly all of it. These cases formed the population base for the finding that the average score for the Goodenough criteria for the chronics was 23.5, while for the arrested it was 34.1. The obtained value of t was 3.5, and such a difference is highly significant (P = .001). The first of the two figures was used as the basis for scoring if it was equal to or greater in the amount of body area depicted. A subscale of 20 items was devised in order to obtain a more exact measure of the degree of primitiveness in the drawings. These items measure the most basic aspects of proportion and the indication of basic body parts. The averages for this subscale are again significant. The average number of essential credits gained by the chronics was 12.1, while the arrested mean score was 16.2. (The t value here was 2.54, P = .02.)

The kind of performance indicated by the low scores in the chronic group would suggest a major interference with intellectual function. Many of the drawings obtained from the chronic subjects resemble the productions of severely disorganized psychiatric patients.

We also investigated the separate scores for their group discrimination value. One item which distinguished between the two groups was the absence of eye detail beyond some basic indication of the eye by a dot or circle. Fifty-nine and one-tenth per cent of the chronics, as compared with 15% of the arrested, failed to give adequate representation to this feature which Machover has termed "a basic organ for contact with the outside world." (43, p. 47). The significance of the various features of figure drawings has not been systematically established. Therefore, perhaps the best recourse at this point is to refer to the propositions advanced by those with the most clinical experience with the method. Karen Machover is perhaps the leading worker with figure drawings. To further quote her interpretation on this point: "A less voluntary and more subtle projection of 'not seeing' is the omission of the pupil and drawing only the outline of the eye. In this treatment, the world is not actively shut out, but it is perceived vaguely, as a sort of undifferentiated mass of stimulations with little discrimination of detail . . ." (it is)—"perhaps a reflection of dependence, shallow emotionally, and lack of discrimination." (43, p. 48).

Another item which differentiated the groups was the absence of hair detail over and beyond some scribbled depiction of hair. Seventy-two and seven-tenths per cent of the chronics and 30% of the arrested did not produce this hair detail. The interpretative significance of this finding is again at present a matter of clinical judgment. Machover considers treatment of the hair as an indication of virility strivings; one might perhaps posit that the type of depiction characteristic of chronic subjects indicates feelings of inadequacy in this area.

Using a slightly larger population base so as to include those who drew more than the head, but still had not represented enough of the total figure to be scored above, we find that 50% of the chronics and 21% of the arrested subjects did not draw hands and/or arms on their figures (chi-square 4.8, P = .05). Machover regards the arms and hands as referring to ego development, interpersonal contact and social adaptation. She states that such omissions cannot be regarded as an oversight and posits that the absence of these features is an indication of an active withdrawal from people and things.

Another feature which distinguished the two groups was the presence of clothing and the degree of detail given to the clothing. Five items of the Goodenough scale were used to assign scores; these items actually comprise a scale ranging from 1) any representation of clothing (including a button), 2) two articles shown, 3) sleeves and trousers indicated in a drawing free from transparencies, 4) at least four articles shown, and 5) costume complete without incongruities. A zero score was given if there was *no* representation of clothing. This scale was condensed into a dichotomy composed of scores 0–3 and scores 4–5. Eighty-one and eight-tenths per cent of the chronic group were scored in the 0–3 category, while only 40% of the arrested subjects could be so classified ($P \leqq .02$). The significance of these findings is difficult to evaluate without other information. It may, however, be considered as part of a trend to be disinterested in details and in the quality of the production; it may be speculatively considered a reflection of the lack of interest in conventional matters among the chronic subjects.

Subjects were requested to draw two figures, one male and one female. Although no direction as to which sex to draw first was given, the majority of subjects drew their own sex first; only three cases drew the opposite sex first and these were one male and two female arrested subjects. Thirty chronic and 23 arrested subjects complied with the request to draw both figures. Forty per cent of the chronic subjects failed to show any differentiation of sex in these two drawings, while only 17% of the arrested subjects did not show sexual differentiation. The probability for frequencies such as this to arise by chance lies between the .05 and .10 level. This trend is of interest, for Machover has noted that identical representations of the male and female figure are "given by individuals whose narcissism is so entrenched that they are unable to project any but their own traits and wishes." (43, pp. 101–102).

A brief inquiry was conducted after the completion of the drawings, aimed at eliciting projections of the activity of the figure. The standard question used was "What might the person be doing in this picture?—Just make anything up." Responses to this inquiry were codified in the following scale: 1) definite activity with purpose, 2) taking a walk, 3) posing for a picture, or lying down, 4) just watching people, 5) nothing, just standing. An example of a response coded in category 3 is "just posing, not thinking." Examples of responses fitting into category 5 are "just standing there staring into space" and "standing around and killing time." The distributions of responses along these scale steps followed the anticipated greater frequency for chronic subjects to be described by the categories indicating lack of purposeful activity, as compared with the arrested. Again, a dichotomy was established, grouping steps 1 and 2, and steps 3–5. For the first drawing, it was found that 63.3% of the chronic subjects produced associations characterized by passivity or absolute purposelessness, as compared with 26.1% of the arrested subjects who could be so described ($P = .01$, chi-square $= 7.6$). Essentially the same finding was obtained in examining the inquiry responses to the second figure. Sixty-four and three-tenths per cent of the chronics and 30.4% of the arrested gave these passive or lifeless associations ($P = .02$). (The number of cases in the chronic group was two less in the analysis of the second drawing; two male subjects refused to draw the second figure.)

The finding that almost two-thirds of the chronic sample are characterized by a poverty of associations to their own drawings is of interest in connection with the Rorschach findings of relatively high M% and aggressive M content in the group. Of the group of chronic subjects characterized by the high M% score, 11 patients had scorable drawings. Seven of these failed to project activity or purpose in associating to their own productions. Of the chronic cases producing aggressive content in the human movement response in the Rorschach, 11 had scorable drawings. Five of these subjects gave passive or purposeless projections of activity to their figure drawings. (These data are based upon the first figure only.) It would appear that a different level of psychological functioning is being tapped by the Rorschach measures of fantasy (the emphasis upon human movement responses and the contents of such responses) and the movement or lack of motion in associations to

a stimulus which is the patient's own product. It seems easier for chronic patients to project movement into presented stimuli; they are less able to enliven their own efforts with similar motion or directed action. The data are not adequate for any definitive statement. However, these observations led to the speculation that such a combination of behavior indicates that the fantasies and inner life of the patient are "empty" and not really related to potential human interaction. To obtain evidence which would enable some evaluation of this supposition, it was decided to examine the interrelationships between the inert and passive associations to the drawings with a Rorschach measure of lack of emotional investment in the environment. Individuals who produced no color responses, or whose only color response was of the pure C type, were selected; 13 of such patients produced scorable drawings. It was found that nine of these 13 gave passive or purposeless associations to their own productions.

Forty and nine-tenths per cent of the chronic patients who produced drawings attempting to portray the whole figure, or at least half of a figure, drew figures which qualitatively showed severe regressive trends. A number of these drawings startlingly resembled productions of children with mental ages of from 4–5 years.

TABLE 6.—ROSENZWEIG PICTURE-FRUSTRATION FINDINGS

Score	Norm	(N = 38) Chronic	(N = 23) Arrested	t	P
		Average	Average		
∗E′	2.0	2.2	1.7	—	—
∗E	6.6*	6.2	5.4*	2.16	.05
∗e	2.0	1.9	1.7	—	—
X I′	1.3	1.1	1.3		
∗I	2.6*	3.8*	3.4	3.9	.001
∗i	2.6	2.1	2.9		
∗M′	1.4	.99	1.2		
∗M	3.2	3.3	3.5		
∗m	1.8	1.9	1.9		
%O-D	20.0	17.6	20.1		
%E-D	53.0	56.3	50.5		
%N-P	27.0	25.3	27.5		
%E	45.0	43.8	40.5		
%I	28.0	28.8	30.9		
M%	27.0	25.3	27.5		

* Indicates the groups which are significantly different from each other. The norms used are those reported by Rosenzweig for 236 male cases (60).

The figures are characterized by huge and disproportionate heads, with either omission of any depiction of the trunk or an undifferentiated box or circle to which the legs were attached. Several showed striking similarity to the productions of patients with organic diseases of the central nervous system, with the absence of a completed line which might enclose the head. All of the figures which qualitatively were judged regressive shared the complete lack of clothing together with a complete lack of sexual differentiation; the figure was just an outline, frequently with highly irregular line quality, against the white page.

Some inter-test relationships were investigated; particularly the writers were interested in the relationships between the high W% and the primitive figure representation. It was found that all of these cases showed (W% ≧ 50) in the Rorschach. Only one arrested case produced a drawing of this regressed type; he too showed the high W%. This finding supports the contention that within certain contexts, the W% may be taken as an indicator of diffuse and global functioning with an inability to differentiate details. A number of other scores could have been investigated; however, only the (Fc = 0) score was, because it was felt that this measure of capacity to delay impulse expression in the interest of cautious adaptation would not be found in persons who showed such disorganized and regressed features. It was found that *all* of the patients who produced the primitive drawings, and all who also had the high W%, failed to give even one Fc response. It is interesting to note that the one arrested case who was described by the primitive drawing-W% constellation *did* produce an Fc plus percept in the Rorschach.

C. Rosenzweig picture-frustration data

The data obtained from the Rosenzweig picture-frustration study are summarized on table 6. Averages are presented for both the criterion groups. Rosenzweig's normative data are also given. The arrested and chronic groups were compared with each other on each of the 15 subscores of the P-F study; none of the differences was statistically significant. Each group was then compared to the normal sample, making a total of 45 tests of signifi-

chance. Two differences attained the desirable level of significance; however, an evaluation of these findings must take into account the fact that we might expect two or three tests out of 45 tests to reach the .05 level by chance fluctuations. It is interesting to note that the scores which were significant were those which were predicted to differentiate the criterion groups. We had advanced the hypothesis that the chronic patients would show higher Intropunitive and Extropunitive scores as a function of presumed greater undischarged aggressive tensions. Actually, as table 6 shows, both arrested and chronic subjects manifest more I (intropunitive-ego-defensive) responses than the normal group, with the chronic subjects showing a higher number of these responses. Only the chronic versus normal comparison is significant.

We note too that both arrested and chronic subjects tend to produce less responses of the E (extropunitive-ego-defensive) type than the normal. The predicted trend for more of these responses to appear in the chronic group than in the arrested is indicated, but it is not statistically significant. However, the average production of the arrested group is significantly lower than the norm.

Thus both groups share a trend toward more internalized aggression in the interests of ego-defense than is indicated by normal subjects with the P-F method. However, only the chronics show significantly greater scores for this variable ($\neq$ I), as compared with the norm, and produce somewhat more of this type than the arrested do. The trend for more test responses of the ego-defensive externalized aggressive type in the chronic group than in the arrested is indicated. However, when we refer to the norms, we find that perhaps the most accurate statement of our findings is that the arrested group shows less of this type of response than might be expected. Several authors (32, 41) have noted that this score may reflect needs and fantasies; persons who produce many such responses are not likely to manifest overt aggression. In summary, what is suggested by the P-F findings is the proposition that while both groups tend to internalize aggression (a trend more marked in the chronic group), the arrested subjects would seem to be able to achieve some discharge of aggressive tensions in their overt behavior rather than build fantasies of outer-directed hostility.

We may also note the following trends in the data of table 6: Arrested subjects produce slightly less and chronic subjects slightly more than the normal responses of the ego-defensive type, ignoring the direction of tensions. There has been advanced the hypothesis that a high number or per cent of ego-defensive responses is indicative of a weak ego; however, this supposition has yet to be verified. There is a slight suggestion of a lower orientation toward problem solution among the chronic subjects, as indicated by the lower N-P% (Need-Persistence) and particularly the number of i responses (where amends are offered by the subject to solve the problem).

D. Szondi data

The Szondi pictures were administered to all subjects, and all possible group differences for the scores obtained from the patterns were examined. The eight factors were checked for factor loading, positive versus negative choice, and difference scores (i.e., the number of negative choices was subtracted from the number of positive choices in each vector). Thirty-two tests of significance were performed; of these only one attained a satisfactory level of significance. By chance alone we might have expected one test to differentiate at the .05 level or better with the total number of such tests performed.

However, it is interesting to note that the score which reached significance is one related to a predicted difference. This is the difference score for the Sadist factor. The average balance of positive choice of the portraits of sadists (reached after subtracting the negative choices) was 1.48 for the chronic group and only 0.4 for the arrested (t 1.99, $P = .05$). Although the Szondi interpretive schema has yet to be empirically confirmed, as we noted above, there is some evidence that the sadist factor has some reliability (57). This trend toward positive identification with pictures of actual sadists among chronic patients may perhaps be attributed to the impact of hospitalization with its enforced limits on activity. Such a choice pattern is considered by leading workers with the method as indicative of a strong need for

motor discharge which is closely related to aggressive tensions.

VI. Summary

Many of the hypotheses set forth before the analysis was begun have been confirmed by the data. Further, the demonstration of discriminating patterns of performance provides an empirical basis for integrated interpretations of the performance variables.

We will now proceed to compare our results with the findings of other observers.

Turning first to the study which is closest to the present one in terms of criterion groups and technique of observation, the Ellis and Brown report, we find that our data are in close agreement with their Rorschach findings for "Declining" and "Recovering" tuberculosis patients.

Significant Rorschach Differences

Comparison of Results for "Declining" and "Recovering" Tubercular Patients with Those in the Present Study: (Adapted from Ellis and Brown)

	Declining (N = 13)	*Recovering* (N = 13)	*Chronic* (N = 41)	*Arrested* (N = 25)
# Responses	19.2	32.1	15.07	25.1
# M	1.5	3.0	1.8	1.9
Sum C	1.04	3.14	1.68	2.58
# Populars	5.5	7.5	5.5	7.32

These were the only scores which were directly comparable since Ellis and Brown report only mean differences. Another score found to distinguish the "Recovering" from the "Declining" group is the number of content categories used. The "Recovering" patients utilized an average of 10 different categories, in contrast to the mean of seven used by the "Declining" patients. This is a measure of the relative restriction of the range of available associations and is somewhat comparable to the current findings of greater stereotypy on the chronic group as indicated by the incidence of cases producing Animal content responses equal to or more than 50% of the total. We found the same trend for patients with unfavorable prognosis to be characterized by a significantly lower response total, lower number of color responses, fewer popular responses and a greater number of rejections, in comparison with either "Recovering" or arrested groups. However, Ellis and Brown found a higher number of human movement responses in their "Recovering" group, while the present data show no group differences for this variable. We did find that the chronic patients produced more M responses relative to the response total than did the arrested group; Ellis and Brown do not report the M% so that no adequate comparison is possible.

That there is this general trend of agreement is of considerable importance in evaluating the present findings. One of the limitations in the study design is the lack of control of the factors of hospitalization and active disease. Hence, it might be argued that the observed differences between the chronic and arrested groups might be largely attributed to the impact of hospitalization and the presence of an active disease process, rather than to more long-standing personality characteristics which may be related to recovery potential. The Ellis and Brown study is controlled for both hospitalization and duration of illness although there is no control for the severity of the disease process. One factor ought to be noted which limits the usefulness of the Ellis and Brown study for comparative purposes: Their sample is restricted to females, while the present samples are composed predominantly of male subjects.

Nevertheless, the findings of constricted productivity, diminished emotional ties with the environment, limited ability to share conventional views, and a greater tendency to refuse to cope with difficult situations as more characteristic of patients with unfavorable prognoses as compared with patients who are recovering suggest that it is not hospitalization effects that account for these same differences in the present study. A comparison of the data for the "Recovering" hospitalized group with that for our arrested (non-hospitalized) sample shows in fact that the hospitalized group has higher productivity on all of the measures for which comparison is possible. In weighing this observation, it ought to be remembered that the "Recovering" group is composed of females, and we found that female chronic patients did not show the pattern of emotional constriction that was characteristic of the males.

Our Rorschach findings are not in agreement with those of Singeison insofar as comparison can be accomplished considering the differing

methods of presentation of data. He found that his chronic sample manifested highly impulsive affect which, although disturbed by ego-centric and maladaptive features, indicated an active rapport with the environment. He reports that only three of his 50 cases, or 6%, fail to produce any color responses. In contrast, 39% of our chronic sample showed this constriction of outer-directed affect. Also, whereas 26% of his group failed to produce any shading responses, 39% of the present sample so failed. Singeison emphasizes the extratensive trends in his sample, finding only one case (2%) who produced M responses but who failed to produce any color responses. We found 29.3% of our chronic sample produced the introversive pattern of a relatively high M% and no color production. Further, Singeison's data show that 26% of his sample produce color responses but no human movement, in contrast to only 14.7% of our cases. His data also show only one-third of the chronic sample to be characterized by marked stereotypy as this is measured by an Animal or an Anatomy content which is one-half or more of all responses. We found over two-thirds of our chronic group showed this marked limitation in the range of available associations. Singeison's finding with respect to the great extratension in chronic patients was found by Metzer (N. V.), who also reported upon a European population. Unfortunately, his actual data are not available for more careful comparison.

As has already been noted in the summary of the literature in Section II, the cultural differences may be considered as related to the lack of agreement between our data and that of Ellis and Brown, on the one hand, and the two studies based upon European subjects on the other. The writers have no information as to the nature of the sample from which Metzer obtained his Rorschach observations, but the Swiss peasant and working-class group used in the Singeison study shows none of the constriction of affect, the introversion, and little of the stereotypy that we have inferred from our findings.

Comparison of the findings for Lindner's sample of arrested male veterans with our arrested sample must rest solely upon the mean differences that she reports. There appear to be no striking differences in the mean performance for a number of Rorschach variables, except for a trend for the Lindner sample to be more restricted and less productive than the present sample.

Many of the personality characteristics of unfavorable outcome described by clinical interviews or long-term observation of patients are supported by our findings.

Muhl's description of inertia, dissociative trends, hindered self-expression and general loss of interest in the environment, based upon interviews, are consonant with our Rorschach and drawing data.

The many references to the conflicts with regard to receiving support from other persons and the inability to express hostility may be considered in agreement with our findings with regard to the turning away from the environment and the aggression in the M contents.

Much emphasis has been placed upon the dependency factor in the impressionistic literature. We, of course, have no direct measurement of the intensity of this need and the conflicts aroused by such strivings. However, it might be inferred that persons characterized by the marked affective constriction and the weak ego-structure (which may be inferred from the constellation of scores we have also termed lack of social skills and controls) would have great difficulty in achieving gratification of many specific emotional needs. For prediction purposes, it may not be necessary to specify the particular needs being thwarted.

Rather than speak of only thwarted dependency needs, or inability to express hostility, we may be confronted with personalities characterized by a pervasive fear of interpersonal contact of both positive and negative affective quality. It is the opinion of the authors that the assessment of psychological characteristics in structural terms might be a more fruitful mode of approach for research into recovery from illness than an attempt to specify concrete needs. It may be that this level of conceptualization is relevant to the outcome factor in disease generally, and not restricted to tuberculosis. This is of course a question to be decided empirically by further work with other diseased populations.

We also previously presented the data of White and Lewis, which demonstrated the

empirical association of schizophrenia and tuberculosis, and elaborated upon the parallels between the physiological and psychological processes in both diseases. These data have been especially useful in suggesting a conceptual framework to which the present results may be ordered. In our chronic patients, who do not have any gross psychiatric disturbance, we find a pattern of adaptation which may be described as schizoid: the basic affect disturbance, the lack of orientation toward conventional aspects of reality, the poorly-organized and under-socialized ego-structure, and in a subgroup the turning inward upon the self in autistic fashion.

To attempt to establish a hierarchic organization of the psychological characteristics related to differential outcome is a difficult task. Logically one might expect a constant reinforcing relationship between a lack of appropriate ways for relating to other persons and the tendency to withdraw or turn away from emotional interaction. Perhaps those subjects who turn toward fantasy might be differentiated from those who turn away from the environment and do not substitute an active inner world. Fantasy production may be considered as an attempt at some compensation for lost real satisfactions and interactions. Or perhaps the severity of regressive features within the context of a poorly-organized ego and a turning away from the environment might be considered as another variable which permits a more refined ordering of personality structures. However, even regression represents some reparative attempt on the part of the person. To the writers it would seem that persons who show the pattern of lack of environmental interest, flattened affect, lack of ego controls together with marked stereotypy are perhaps the most severely damaged personalities. These are persons who perhaps may be considered as giving up all expectation of deriving gratification.

We have noted that both groups of subjects share signs of difficulties in adaptation. The arrested sample is not to be characterized as well-organized; they only approach the conception of "normal" and evenly balanced functioning. What seems to be decisive for discrimination is the presence of compensatory features in the arrested group.

We have presented a number of scores derived from performance on the Rorschach and from figure drawings which have distinguished chronic from arrested tuberculous subjects.

The data given on tables 1 and 2 are based upon a number of Rorschach variables. The chronic patients in contrast to the arrested subjects have been shown to be characterized by a low level of productivity, a reluctance to respond to presented tasks, marked stereotypy and restriction of interest, non-conformity of thought processes, limited social sensitivity, limited ability for establishing emotional relationships, blocked responsiveness in situations with strong emotional charge, marked constriction of affect, limited interest in the practical and obvious aspects of situations. Only the introversive features appear to have withstood the general constriction.

A rough but rapid picture of the kind of overlap that exists between the two criterion groups may be obtained by noting the following distribution (the score M response to card I and/or II has been omitted from this tabulation):

FREQUENCY DISTRIBUTION FOR THE NUMBER OF SCORES FOUND PER RECORD, BASED UPON 17 ITEMS FOUND TO SIGNIFICANTLY DISCRIMINATE BETWEEN CHRONIC AND ARRESTED

No. of Scores	*Arrested (frequency)*		*Chronic (frequency)*	
0	4		0	
1	3		2	
2	4	88%	5	29.3%
3	7		3	
4	2		0	
5	2		2	
6	0		1	
7	1		3	
8	1		2	
9	0		3	
10	1		4	
11	0		2	
12	0	12%	5	70.7%
13	0		1	
14	0		4	
15	0		1	
16	0		2	
17	0		1	

This tabulation provides a gross quantitative index of the fact that the chronic subjects are frequently characterized by a great number of the separate scores pointing to some aspect of adaptation difficulty. The pattern tabulations presented in tables 3 and 4 have tried to

demonstrate concretely the kind of constellations that are found almost exclusively in the chronic group.

The pattern findings may be summarized as follows: In the chronic group, the maladaptation seems to be pervasive. Frequently we observe patterns which reinforce the inference that there is very limited ability to function without considerable tension and effort in ordinary situations. This inadequacy for social adaptation seems circularly related to a profound emotional withdrawal from other persons and things. In about a third of the cases, this withdrawal is accompanied by autistic trends. However, some of these patients appear to be functioning at a generally reduced level and seem to have very little ability to strive even in fantasy for positive goals. Although many of the arrested cases are characterized by diffuse anxiety, they tend to show a maintenance of adaptive skills and of affect.

We have found that whereas 56.3% of the chronic subjects show the marked constriction of affect for interpersonal relationships, only 12% of the arrested are so described. We further have found that the majority of these affectively constricted chronic subjects show deficiencies in their adaptive capacity on more superficial levels, so that we may speak of an emotional constriction so great that there is a loss of social sensitivity and ability to share in common perceptions of reality. The emotional constriction, when found in arrested subjects, would not appear to be so profound, for it does not inhibit the maintenance of adaptive functioning.

The figure drawing data bear out the Rorschach findings and further indicate the existence of a major interference with intellectual functioning in a subgroup of the chronics; we find the primitive features characteristic of children of the age range 4–5 and also in persons with psychosis or diseases of the central nervous system. A common condition present in the groups just mentioned is that of under-socialization, a kind of isolation from the usual social interactions of mature adults.

Many significant differences have been established. The question arises: Just what are the observed differences discriminating? It may be that we have been observing personality differences in disease as compared with health; whether or not the findings are to be regarded as limited or specific to tuberculosis cannot, of course, be answered from the present investigation. However, the close agreement with the Ellis and Brown study in which the factor of "illness-in-a-hospital" was controlled would indicate that we may view the present findings as correlates of the prognosis or outcome variable. A more exact description of the relationship between personality variables and outcome in tuberculosis is beyond the scope of the current study; it is hoped that our data can offer guides to a more definitive investigation.

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HYPNOTIC PHENOMENA, INCLUDING HYPNOTICALLY ACTIVATED SEIZURES, STUDIED WITH THE ELECTROENCEPHALOGRAM[1]

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In 1776, the Austrian physician, Franz Anton Mesmer, began his work with animal magnetism, or hypnotism. The same convulsive phenomena, spectacular surgical anesthesias, bizarre hallucinations, regressed behavior and telepathic communications that Mesmer and his many successors obtained have never failed to stir controversy as to what was genuine and what was simulated, and what changes actually occurred in the body. With the advent of new measuring technics, the trance state again was intensively studied. In some subjects profound and striking psychosomatic changes were noted. An excellent modern review of this subject can be found in Wolberg's two volumes (13).

Our purpose was to repeat some of the previous hypnotic experiments (5), using the electroencephalogram, and also to make special studies with the more recently discovered technics of lambda waves, wicket waves and the photic response. Accordingly, we then studied hypnotically-produced visual hallucinations, blindness, anesthesia, phantom hand movements, sleep and regression. We wondered if seizures could be activated by an hypnotic technic, and if so, what changes might occur in the electroencephalogram.

PROCEDURE

The trance was induced by an eye-fixation and levitation technic while the subject was connected to an eight-channel Grass ink-writing electroencephalographic machine. The same general prevailing conditions of illumination and distracting external stimuli, such as telephones, typewriters or epileptic outcries, held for both the control and hypnotic states in our 11 physician-subjects and 35 patients. Although any grading system for depth of trance has its drawbacks because of the unequal distribution of phenomena, for the purposes of this study we graded the trance as follows:

Grade 1. Physical relaxation and catalepsy of eyelids and limbs.
Grade 2. Grade 1, but in addition, anesthesia.
Grade 3. Grades 1 and 2, but in addition, greater extension of anesthesia, blindness and hallucinations.
Grade 4. Three previous grades, but in addition, regression and more striking psychosomatic phenomena.

At the conclusion of every trance the subject received suggestions that oriented him to his pre-hypnotic state.

VISUAL PHENOMENA

Eleven subjects, mostly physicians, were studied for visual phenomena in the presence of medium to deep hypnotic trances, by means of the electroencephalogram. The results are summarized in table 1. In addition to the requirement of a deep trance, with visual hallucinations and blindness, there was the problem of obtaining good control visual phenomena when the subject was not in a trance. For instance, if the subject had inhibition of alpha rhythm in the presence of visual hallucinations, as reported earlier by Barker and Burgwin (1), it was important to know what the reaction would be in the normal conscious state, with only imagination of a vision. The same would hold for lambda waves; for instance, their response to the "look-at-the-picture" test, whether they occurred during conscious conjuring of a vision with the eyes closed, or finally, whether they occurred spontaneously when the subject was looking about the room. Special interest was devoted to lambda waves in the presence of hypnotic hallucinations since Gastaut (4) has noted the appearance of these waves in the electroencephalograms of some psychotic patients having visual hallucinations. Our experience confirms this observation.

In none of the 11 subjects were the alpha

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TABLE 1.—VISUAL PHENOMENA OF 11 PHYSICIANS DURING DEEP HYPNOTIC TRANCES STUDIED ELECTROENCEPHALOGRAPHICALLY

Subject	Control Lambda Response to "Look at the Picture" (Eyes Open), Grade*	Lambda Response to Hypnotic Visual Hallucinations (Eyes Closed), Grade*	Alpha Response to Hypnotic Visual Hallucinations (Eyes Closed)	Control Alpha with Eyes Open	Alpha with Eyes Open during Hypnotic Blindness	Lambda Response to "Look at the Picture" during Hypnotic Blindness (Eyes Open), Grade*	Photic-Drive Changes during Hypnotic Blindness (Eyes Open)	Clinical and Miscellaneous
1	1–2	1–2	Inhibition	0	Occasional	1	Graphically absent response as compared with control; strong alpha probably masks drive	Grade 4 trance. No lambda with mescaline visions; could not be hypnotized at height of mescaline psychosis
2	0	0	Inhibition	0	Occasional; Eyes taped open	0	Minimal flattening or decrease	Grade 3 trance. Marked increase in alpha during blindness and deafness with eyes open
3	3	0	Inhibition	Occasional	0	1	Increased low-amplitude drive with many harmonics	Grade 3 trance. No lambda with hypnotic reinforcement of LSD-25 visual hallucinations. LSD-25 visions abolished in hypnotic trance without change in electroencephalogram
4	1	0	Inhibition	0	Occasional	0	—	Grade 3 trance
5	1	1	Inhibition	0	Occasional	0	No change	Grade 3 trance
6	1	0	Inhibition	0	—	—	—	Grade 3 trance. Could not abolish LSD-25 visual hallucinations in the trance: no electroencephalographic change
7	1	—	—	0	0 Eyes taped open	—	Higher amplitude response	Grade 3 trance. Pupils markedly dilated with suggestion of darkness; disappearance of alpha with suggestion of bright light
8	2	1	Inhibition	Occasional	More frequent; Eyes taped open	—	Higher amplitude response	Grade 4 trance. Markedly dilated pupils with blindness; sluggish reflex to light. Reaction reverts to normal on suggestion of vision
9	2	½	Inhibition	Occasional	Occasional	½	Increased response of lower amplitude with more harmonics	Grade 3 trance
10	2	½	Inhibition	0	0	—	No change	Grade 3 trance
11	0	—	—	0	Occasional	—	Increased response of low-amplitude harmonics during suggestion of continuous bright light	Grade 3 trance. Immediate sustained bursts of alpha activity with eyes open when in trance and told room is dark

* Grade 1 = minimal; Grade 2 = moderate; Grade 3 = marked.

waves suppressed, and in none did lambda activity appear when the subject's eyes were closed in the attempt to imagine a scene, without hypnosis. In nine subjects with hypnotic visions alpha activity was concomitantly suppressed with the eyes closed. Of the nine, five had some lambda waves at this point. In general, the lambda response with hypnotic hallucinations was minimal, in comparison with the controls. A factor that might account for this reaction is that the eyes are closed during the vision, in contrast to the fact that the eyes are open and moving about a real picture during the control observations. Groethuysen and Bickford (6) have found lambda waves to be associated with eye movements. Clear-cut, concrete visions in the subjects with the best lambda response to hypnotic hallucinations would suggest greater eye movements than in those patients whose visions consisted of abstractions and fantasies.

For instance, subject 1, a fisherman, engendered good lambda waves when he had a vivid vision of a great northern pike, whereas subject 8 engendered poor lambda waves while he was describing a vision of Ernest Hemingway fishing. The lambda waves, however, could not be produced in the fisherman by mescaline-induced visions, which consisted of multiple abstractions and fantasies. He could not be hypnotized at this time.

In an attempt to potentiate any lambda response to visual hallucinations, two subjects, while at the height of the d-lysergic acid diethylamide (LSD-25) psychosis with visions but no lambda activity, were hypnotized. Although clinically the visions were alternately augmented and abolished in one subject and impossible to influence in the other, no concurrent electroencephalographic changes were noted.

Absence or marked suppression of lambda

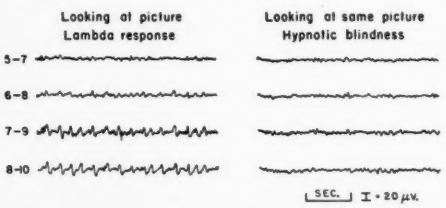

FIG. 1. Change in lambda response during hypnotic blindness.

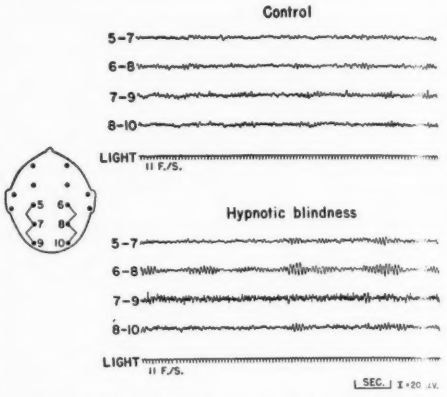

FIG. 2. Driving response at photic stimulation of 11 flashes per second in the control state and during hypnotic blindness.

waves occurred in five of six subjects with hypnotic blindness when they looked at the control picture (fig. 1). In spite of encouragement to gaze around the picture which they held in their hands, it was probable that their eyes did not move about as in the unhypnotized state. In two other patients with lack of lambda response during hypnotic blindness, no eye movements were discerned by means of eye leads. Even so, why there should be such uniform restriction of eye movement in the presence of hypnotic blindness is a question in itself. Possibly it is an attempt to shut out all alerting stimuli that might interfere with the successful accomplishment of the suggestion.

Of 11 subjects, three manifested occasional alpha waves in the control with their eyes open; one of these had no alpha waves with the eyes open when hypnotically blinded. Seven subjects exhibited some sporadic alpha waves when hypnotically blinded with the eyes open and under the same conditions of illumination as in the control. In no instance were we able to repeat Loomis, Harvey and Hobart's observation (9, 10) of alpha activity occurring during 15 seconds of hypnotic blindness and suppression of the alpha rhythm during alternate 15-second periods of suggested vision. The eyes of three subjects in deep trances and blindness were taped open, as were the eyes of the above-mentioned subject, but none had any particular change in alpha activity. Despite no striking change in the

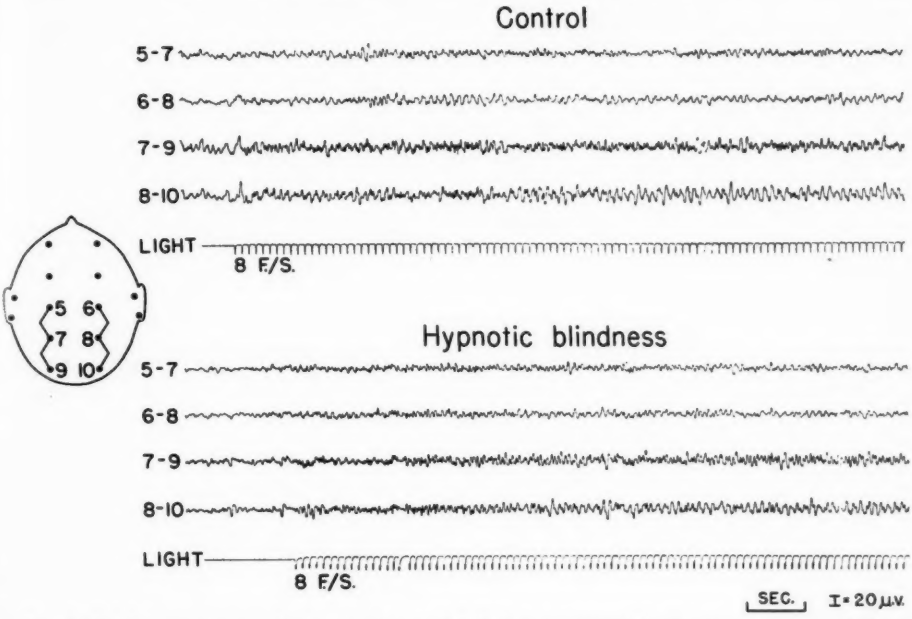

FIG. 3. Driving response at photic stimulation of 8 flashes per second in the control state and during hypnotic blindness.

electroencephalogram, in two of these three subjects who received the suggestion of blindness "that would be like total darkness", pupils developed that were much more dilated and sluggish in their reaction to light. This pupillary response reverted to normal with the suggestion of normal vision.

An interesting electroencephalographic response was noted on photic drive in seven of nine subjects with hypnotic blindness. Subject 1 (fig. 2), with a control driving response at 11 flashes per second, had no graphic evidence of driving during hypnotic blindness. Rather than true suppression of the driving response, it is more likely that with the combination of blindness and flashing light a strong alpha rhythm developed that masked the driving response. Subject 2 had minimal flattening and less apparent driving response when hypnotically blind. Subject 3, when hypnotically blind, showed an increased driving response of low amplitude with many harmonics (fig. 3). Subject 7 showed an increased drive of higher amplitude in the blind state as compared with his control. Of the remaining three subjects in this group of seven who had hypnotic blindness, all had better driving responses in the trance; one of higher amplitude and the other two of lower amplitude and many harmonics. There does not seem to be any consistent clinical correlation with these data. In two subjects who received the suggestion of continued light flash after the light actually was turned off, there was no response different from the control. Because of the conflicting types of photic response with blindness, it would seem that the state of alertness or relaxation might be relevant. This in turn would depend on the neurophysiologic changes associated with the meaning of blindness to the subject. The response is, of course, in no way like a totally absent response that would be anticipated in the presence of total blindness to perception of light, as in complete optic atrophy.

ANESTHESIA

Ten subjects, of whom six were physicians and four were patients, were studied as controls and while under hypnotic anesthesia. The technic used consisted of a short volley of pinpricks to the dorsum of each hand while the

eyes were closed. Earlier, in a good subject, Loomis and associates (9) reported suppression of alpha activity as a result of pinpricks during hypnotic anesthesia. No control measure was employed. Seven of our subjects had excellent subjective anesthesia and three only fair. Because of the normal spindling of the alpha rhythm, it was hard to discern any change in several cases. However, there was no difference in the alpha response between the control and the trance state. In five subjects there was no constant alpha inhibition. In the remaining five there was a variable degree of alpha suppression. In three subjects with regression to early childhood there was no change in response, despite maintenance of good anesthesia. In one subject, the additional factor of an LSD-25-induced psychosis while the subject was hypnotized, and with suggested anesthesia, showed no response different from the control and plain hypnotic anesthesia. The experiment was repeated with one subject who had no scalp electroencephalographic changes and in whom good control hypnotic anesthesia was achieved, and in the repetition depth electrography coincidental to other studies was used. Although this subject had considerable pain after a recent craniotomy, and despite the fact that his pain was completely relieved during the trance so that he could fall asleep without the necessity of drugs, there was no discernible change in the depth waves on pinprick stimulation. The areas measured were deep in the frontal, occipital and temporal lobes. This does not rule out electroencephalographic changes in other areas deep in the brain.

These studies throw no light on the mechanism of hypnotic anesthesia unless it be that they indicate an altered state of attention where pain is perceived but not appreciated in its emotional aspects. Although some have compared hypnotic anesthesia to psychologic lobotomy, the comparison does not explain the mediating mechanism. However, the clinical fact remains that in good subjects, major surgical procedures can be undertaken solely with the aid of hypnotic anesthesia.

Wicket Rhythm (Arceau Rhythm)

Because of Gastaut and Bert's studies (3) of wicket waves and their inhibition by the effects of movement or imagined movement, such as while watching a prize fight, together with the unusual observation of Klass and Bickford (7), who studied a patient who had undergone high amputation of the left arm and who had inhibition of wicket waves while opening and closing his phantom fist, we investigated five subjects with good control wicket rhythm. While in a deep trance they were asked to open and close a phantom hand after they had become seemingly unaware of their somatic hand by hypnotic spatial disorganization. Even though the desired subjective effect was attained, there was no change in the wicket activity, unless it became slightly more frequent.

Sleep

Natural sleep and the hypnotic trance were believed to be parts of the same fundamental phenomenon until 1947, when Dynes (2) reviewed the pertinent literature and showed the two conditions to be really quite different. The relationship between the two states was narrowed down, however, by the production of true electroencephalographic sleep with specific suggestions. In Barker and Burgwin's four subjects with illustrative recordings only flattening was demonstrated. Among our seven subjects in whom sleep was induced hypnotically, flattening showed in three, spindles and V waves were noted in three, and 120-microvolt, 1-to-2-per-second slow waves were recorded with depth leads from one subject. In the latter case some increased activation of a spike-wave temporal focus was noted. In no cases were K complexes obtained. Two subjects with V waves would remember nonsense syllables only when these were associated with the alerting of alpha activity by the stimulus word during sleep. One subject whose record showed the flattening effect of light sleep failed to recall the word, "tiger", spontaneously, but chose it from a list of several words.

Although these observations are too few in number to permit the formation of any valid opinion concerning the relationship of memory, recall, amnesia and symbology to the level of sleep as revealed by the electroencephalogram, the sum total of cases shows that sleep induced by the trance can, like natural sleep, proceed

to the stage at which V waves are produced. It would be of interest to determine if the type of dream material occurring during hypnotically induced sleep could be correlated with the level of sleep as indicated by the electroencephalogram. For example, a dream topic could be suggested to a subject while he is at a certain level of sleep. After the subject is awakened, the dream material which he reported could be studied in an attempt to correlate the different mechanisms of dream work (displacement, condensation, dissociation, repression and the like) with the various levels of sleep.

Automatic Frequency Analysis

Two subjects were studied with the Ediswan automatic-frequency analyzer. In the first subject only the left parieto-occipital area was analyzed. In the other subject the sylvian, frontal, parietal and occipital areas were analyzed. Clinically, both subjects showed the hypnotic phenomena of catalepsy, automatic movements and anesthesia. In no instance did the analysis reveal any difference between the control state and the hypnotic trance. This was also true with reference to hypnotic blindness, which was studied in the second subject and checked with photic stimulation. However, when the mental age of this second subject was regressed to three years, at which point he chattered like a 3-year-old child, the record on gross inspection resembled that produced by drowsiness or light sleep. This was substantiated by frequency analysis, which revealed a shift to the delta and theta bands, in contrast to the usual alpha predominance (fig. 4). This result was not constant and reproducible.

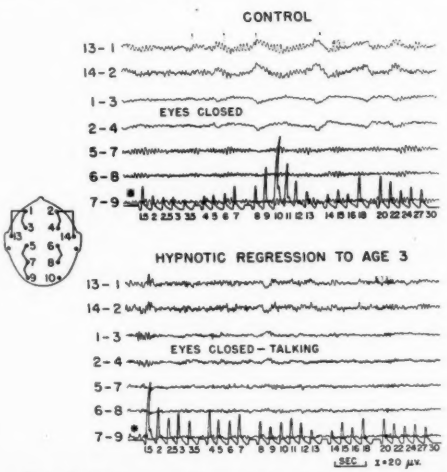

Fig. 4. Electroencephalographic effects of hypnotic regression to age 3. Automatic frequency analysis of left posterior, parietal occipital area.

Regression

Deep regression was carried out in five subjects. In no case was there any notable electroencephalographic change. In two cases clinical regression was advanced, with the assumption of infantile facies, inability to talk and withdrawal phenomena on plantar stimulation. In one case a fronto-occipital muscle artifact constantly appeared when regression had reached the 1-year level. In another subject, an inveterate stutterer, speech was normal during the trance and regressed state; yet the electroencephalogram was unchanged.

In the next section of this paper are mentioned many cases in which regression and appropriate suggestions failed to precipitate seizures in patients with striking electroencephalographic abnormalities and histories of convulsive disorder triggered by nervousness.

Seizures with Probable Organic Cause

Kupper's hypnotic activation (8) of a seizure in a sailor in whom regression was carried to a traumatic period of his life, with the concomitant electroencephalographic dysrhythmic changes and their subsequent normalization when regression was carried further, suggested our hypnotic studies on a series of 16 patients with convulsions. The patients were selected according to the indication of convulsions on the referral card, and were hypnotized after the control recording had been completed.

With the same technic as used previously, moderate-to-deep trances usually were obtained within several minutes. Many of the patients gave nervous tension, fatigue or menstrual periods as the precipitating factors in their seizures (table 2). When in a deep trance the patient was then instructed that at the count of five he would have an overpower-

TABLE 2.—HYPNOTIC REPRODUCTION OF SEIZURES: 16 PATIENTS SUBJECT TO CONVULSIVE SEIZURES, WITH PROBABLE ORGANIC CAUSE

Patient		Diagnosis, Duration of Disorder	Clinical History	Electroencephalogram	Hypnotic Trance
1	38 M	Convulsive disorder, 5 years	Temporal-lobe fits: 5 years—déjà-vu phenomenon as aura when patient feels transferred to places familiar to him; facial pallor, sweats, headache	Minimal dysrhythmia, bi-temporal, maximal left. Metrazol test; no clinical or electroencephalographic activation	Grade 2, nothing obtained; no memory of déjà vu, seizure. No response to suggestion of precipitating factors of "tension and fatigue"
2	33 M	Convulsive disorder, 11 years	Head injury 11 years ago; first attack followed Normandy landing. Nervousness precipitates tonic-clonic convulsions with tongue biting	Marked dysrhythmia; generalized spike wave. Metrazol-electroencephalographic activation of myoclonic type of petit mal with clinical seizure	Grade 3, despite good clinical regression to time of Normandy beach; no seizure or spike wave
3	46 M	Convulsive disorder, 11 years	Head injury 12 years ago. Aura of odor in left nostril followed by petit mal	Minimal delta, left sylvian; marked dysrhythmia focal sharp-wave, left temporal. Attack during hyperventilation: confusion, refused to obey commands, groping hands (1 minute) associated with 5 per second slow wave, left sylvian discharge with spread to the left frontal region and hemisphere	Grade 3; nothing obtained
4	36 F	Convulsive disorder, 14 years	Temporal-lobe fit: aura of sounds seem distant, feels as if someone is trying to break into the house followed by petit and/or grand mal	Marked dysrhythmia, sharp-wave focus, maximal right temporal	Grade 3; no aura, seizure, memories
5	43 F	Convulsive disorder, 1 year	Paroxysmal vague feeling, tightness in chest, stares	Marked dysrhythmia, generalized, maximal right hemisphere, mixed spike-and-slow wave. Metrazol: activation of right frontosylvian discharge; confusion and disorientation	Grade 3; nothing obtained
6	28 F	Convulsive disorder, 20 years	After pertussis as a child, grand-mal seizures with aura of seeing objects down a long passage	Minimal dysrhythmia, generalized, maximal bitemporal	Grade 3; no aura or seizures
7	17 F	Convulsive disorder, 9 years	Vague visual aura of "mom and dad", followed by petit mal. Usually precipitated by excitement or menstruation	Moderate dysrhythmia, focal sharp-wave discharge, left sylvian. Metrazol: induction of petit mal with spike wave by concomitant photic stimulation	Grade 4; no aura, no seizure, no activation with LSD-25 or hypnosis and LSD-25, in addition to photic stimulation
8	36 F	Convulsive disorder, 2 years	Temporal-lobe fits: aura of lightheadedness, silly dreams and, rarely, tonic-clonic convulsions with tongue biting	Moderate dysrhythmia, generalized, maximal bi-temporal	Grade 3; no aura, no seizure
9	31 F	Convulsive disorder, 4 years	Temporal-lobe fits: sucking of lips, stares, stops talking, feeling of looking at things from a distance	Moderate dysrhythmia, focal sharp-wave, right temporosylvian	Grade 3; no seizure
10	37 F	Convulsive disorder, 6 years	Spells of floating away, hesitant speech, peculiar facial expression, feeling of tremulousness; one episode of syncope	Minimal delta, right sylvian-frontal; moderate dysrhthmia generalized; maximal right sylvian	Grade 3; no seizure, no memory
11	27 F	Convulsive disorder, 3 years	Jerky spells with two episodes of unconsciousness and tongue biting. Precipitated by tension	Marked dysrhythmia, atypical spike and wave, moderate light sensitivity	Grade 3; no seizure or spike wave with suggestion of bright light

TABLE 2.—(Continued)

Patient		Diagnosis, Duration of Disorder	Clinical History	Electroencephalogram	Hypnotic Trance
12	40 M	Convulsive disorder, 7 years	Grand-mal seizures that come on only when completely relaxed	Marked dysrhythmia generalized, multiple spike episodes bisylvian. Metrazol activation: grand-mal seizure	Grade 3; complete relaxation, no seizures
13	21 M	Convulsive disorder	Temporal-lobe automatism: aura of strong memory, bad smell or thought	Marked dysrhythmia, spike wave, generalized. Metrazol: focal right frontosylvian activation; with automatism leading to generalized seizure	Grade 3; no recall, nothing obtained. No change in scalp or depth electroencephalogram in frontal, occipital and temporal lobes
14	10 F	Convulsive disorder, 8 months	Episodes of gazing with loss of contact, blinking and jerk. Precipitated by entering a bright room or scolding by older sister	Marked dysrhythmia, spike and wave, generalized; light sensitive higher frequencies	Grade 3; no seizure on suggestion of sister's nagging; however, increased muscle artifact. With calming suggestions less spike-wave activity on photic drive. Not significant, however, due to spontaneous variation of response and recognized inhibition of spike wave during mental activity in other patients
15	19 F	Convulsive disorder, 6 years	Encephalitis, age 3. Attacks of peculiar feeling, swallowing, purposeless movements. Nervousness and menstrual periods precipitate	Marked dysrhythmia, left temporal sharp-wave focus	Grade 2; no aura or seizure
16	33 M	Convulsive disorder, 6 years	Chiefly nocturnal tonic convulsions; tongue biting	Minimal dysrhythmia, bi-temporal, maximal left	Grade 3; no seizure; just "blankness"

ing feeling. If nothing happened at that point, he was told that he would next have a strong feeling such as he had had before in his life; finally he was told that at the count of three he would have a spell. If all these factors failed, specific suggestions were made that pertained to the history. For instance, if a patient said fatigue or an argument with his spouse precipitated a seizure, an appropriate suggestion was made. In many cases regression was carried to the time of the patient's first or last seizure, yet clinical or electroencephalographic changes could not be produced. In one subject with an 11-year history of seizures which he spontaneously attributed to nervousness as the triggering factor, regression was carried to the time of an incident on a Normandy beach, where he had his first seizure under the tension of battle. Nothing happened in the laboratory. In a light-sensitive, myoclonic epileptic patient no spike-wave discharges were elicited during the trance with the suggestion of bright light. In none of the cases of temporal-lobe seizures were any of the characteristic auras activated.

Peterson (11) found that when his patients with organic epilepsy were hypnotized, there was complete amnesia for the seizures, whereas those whose epilepsy was psychogenic could recall their seizures. In our studies, when the patient was connected to the electroencephalogram while in a trance, no spontaneous material (ideational, affective or motor) was produced that could be linked with the dream states, peculiar feelings or behavior found in the seizures. If organic epilepsy is a symptom of an etiologically broad-spectrum disease, it is surprising that no such material was obtained during hypnosis. Should not something have been activated, if such material was important enough to the patient to determine the seizure pattern? The failure of hypnotic activation by the technic herein described does not imply that seizures of this type cannot be precipitated by emotional factors. Emotional factors often

TABLE 3.—SEIZURES HYPNOTICALLY ACTIVATED: 10 PATIENTS REFERRED FOR ELECTROENCEPHALOGRAPHY BECAUSE OF PRESUMED TRUE SEIZURES

Patient		Presenting Symptoms on Referral to Electroencephalographic Laboratory	Electroencephalographic Diagnosis	Hypnotic Trance
1	18 M	History of head trauma. Seizures of 2 months' duration, aura of tightness in epigastrium followed by tonic-clonic convulsions, can't talk during attack	Minimal dysrhythmia generalized	Grade 3; identical spell as in history, patient confirms hitsory, spell ended by suggestion. No electroencephalographic change in spell
2	39 F	Convulsive disorder for 6 years, sharp sternal pain, cries out, clutches chest, stares, does not talk, jerks right arm, bites tongue, foams at mouth, unconscious for several minutes	Essentially normal	Grade 3; identical spell precipitated and ended by suggestion. No electroencephalographic change in spell
3	33 F	? Space-occupying lesion, 1½-year history of acute attacks of dizziness, tightness in chest, hoarseness, fullness in head, choking followed by nausea, headache, generalized weakness. Past exploratory laparotomy for (?) abdominal disease; advised to have thyroidectomy	Minimal dysrhythmia, bitemporal	Grade 3; identical spell precipitated and ended by suggestion. No electroencephalographic change
4	27 F	? Convulsive disorder of 1 year's duration, acute changes in visual and auditory perception followed by loss of consciousness after ingestion of alcohol, rocking sensation in head, feels ready to float away and faint	Minimal dysrhythmia, bioccipital, maximal left	Grade 3; no attack with "overpowering feeling", typical seizure and recall of previous ones when given glass of water and told it had equivalent of alcohol of 2 glasses of beer. No change in electroencephalogram. No attack or electroencephalographic change with 700 cc. of 5 per cent alcohol, given intravenously
5	17 F	Convulsive disorder for 3 years after auto accident; episodic chewing movements, left side of face twitches, total collapse, clawing of face and throat, whimpering and flushing	Moderate dysrhythmia, generalized, maximal right temporoparietal	Grade 3; identical spell precipitated and ended with suggestion. Face bled with scratching. No change in electroencephalogram during spell. No clinical or electroencephalographic activation with photic stimulation and 950 mg. of metrazol
6	19 M	Eight grand-mal seizures for past year. Dizziness, blackness of vision, falling to ground, tonic-clonic convulsion with drooling from left side of mouth	Essentially normal	Grade 3; typical attack precipitated and ended with suggestion. No change in electroencephalogram during seizure
7	51 F	Paroxysmal atypical right facial pain for 10 years; fine twitching facial muscles on right with unilateral tearing for 80 seconds. Past delirium due to overdose of trichlorethylene	Minimal dysrhythmia bisylvian, maximal left; photic-drive precipitated clinical seizure without change in electroencephalogram	Grade 3; attack produced and ended by suggestion on three occasions. No electroencephalographic changes. Photic drive carried out in trance without precipitation of seizure
8	18 M	Two fainting spells past month, progressively severe headaches for 3 years	Minimal dysrhythmia; focal right sylvian	Grade 3; attack produced and ended by suggestion. Moaning, twitching, grimacing right face, flushing, clenched fists, muscle artifact with fainting. No change in electroencephalogram
9	23 M	Epilepsy for 4½ years; aura: a premonition followed by paroxysmal twitching of right eye and face. Occasional tongue biting, one episode of unconsciousness	Minimal dysrhythmia, bisylvian, maximal right	Grade 3; attack produced and ended by suggestion twice. Minimal tongue biting. No change in electroencephalogram
10	33 M	Post-traumatic convulsive disorder for 10 years after crash in B-29. History of grand-mal seizures with tongue biting frequently followed by vivid hallucinations	Moderate dysrhythmia, focal left temporal sharp-wave discharge	Grade 3; attack produced and ended by suggestion. Jerking of right hand, fluttering of eyelids, jerking of head and whole body, opens eyes widely and searches but no blink or withdrawal on visual stimulation. Has hallucinations of Rhett Butler and little Bonnie falling from a horse; face flushes, slumps forward in simulated faint. No change in electroencephalogram. Discusses previous seizures during trance. Amnesia for seizure afterward

are subtle, and would require a carefully taken psychiatric history for evaluation. Nor does failure of the hypnotic activation in this respect imply that epileptic patients do not have emotional problems and do not need psychotherapy. However, in these cases the hypnotic trance frequently afforded a more relaxed state and consequently a better technical recording with minimal artifact.

Seizures Hypnotically Activated

In table 3 the data concerning 10 patients are summarized. These 10 patients were referred to the electroencephalographic laboratory for what the clinicians had felt were true seizures. All but two of these patients had normal electroencephalographic tracings or minimal dysrhythmias. Patient 5 had moderate dysrhythmia, generalized, maximal in the right temporoparietal area; and patient 10 had moderate dysrhythmia, and focal, left temporal, sharp-wave discharge. By use of the same hypnotic method and non-specific suggestions, seizures developed in all these patients during which the historically identical attack was reproduced and was then ended by appropriate suggestion. During the actual seizure in the laboratory no changes were noted in the electroencephalogram. It was of significant value for the physician to witness the attack. During the seizures some of the patients were seen by trained observers, who felt that the seizures were similar to those occurring in episodes of focal epilepsy and with concurrent electroencephalographic abnormalities.

In this day of medical sophistication on the part of many patients, it is understandable how formerly useful diagnostic points in the history can be incorporated and reproduced by the patients, such as the biting of the tongue and the frothing of patient 2. Patient 5, with the temporoparietal focus, had a typical seizure with hypnotic activation that included clawing of the face and bleeding. There were no electroencephalographic changes, however, and the attack was ended with suggestion. When out of the trance the patient received 950 mg. of pentylenetetrazol (metrazol) intravenously, without the production of a seizure or activation of the electroencephalogram. During their seizures when in the trance, all the patients could be questioned, and from their response and behavior it became quite apparent that their convulsive seizures were defenses or symbolic expressions of psychic conflicts. Beyond the establishment of a diagnosis of psychogenic seizure, no further exploration was undertaken. Many were later seen in the Section of Psychiatry, where a definitive diagnosis was established.

Comment

The non-specific suggestion of the patient's getting an "overpowering feeling" was used rather than the phrase, "getting a spell", because in the latter instance, depending on the meaning of "spell" to the subject, seizures could be induced in normal subjects when in a trance or in hysterical patients without previous fits. If the symptoms of convulsion are determined or precipitated by psychodynamic forces, the suggestion of an "overpowering feeling" in a deep trance should be sufficient to activate the first line of defense; in these cases, the somatic expression of the conflict or the convulsion. As long as the patient has his seizures, the underlying anxiety, propensities toward acting-out or other phenomena are held in check. A causal relationship is indicated by the specific response of spells to the non-specific suggestion of having an "overpowering feeling". Unless the physician is prepared further to investigate the seizure while the patient is still in the trance, it is better that the attack be terminated and that the patient's defenses remain intact, pending careful psychiatric examination. Otherwise, there is always real danger of shifting defenses and unleashing strong suicidal tendencies (12).

Summary and Conclusions

1. Among 11 subjects tested for electroencephalographic changes with visual phenomena when in a deep hypnotic trance, alpha activity in nine was suppressed during the occurrence of visual hallucinations with the eyes closed. Lambda waves were recorded from five subjects in the presence of visions, whereas no lambda waves were produced while they were in a conscious control state with imagination. In five of six subjects, during hypnotic blindness or negative hallucinations, lambda waves were absent or minimal. The additional factor

of the hallucinogenic drug, d-lysergic acid diethylamide, had no modifying influence on electroencephalographic activity when two subjects were in a deep trance with visual phenomena. Seven of nine subjects had minimal changes in the harmonic content of photic response while in the trance state, as compared with the control state.

2. No consistent electroencephalographic change was noted in six physicians and four patients with subjective anesthesia induced by hypnosis.

3. Movement of hypnotically induced phantom hands produced no change in the wicket rhythm in five subjects.

4. Sleep was produced in seven subjects in the trance. In three, the electroencephalographic evidence was a flattening effect; in three, spindles and V waves were noted; and in one, high-amplitude 1-to-2-per-second waves were recorded from depth leads in the frontal, occipital and temporal lobes.

5. Automatic frequency analysis revealed no significant change in two subjects during hypnotically induced catalepsy, automatic movements and anesthesia. However, in one subject, when regression to 3 years of age was done hypnotically, a shift to the delta and theta bands similar to that which takes place during light sleep occurred.

6. Hypnotic regression was carried out in five subjects, with no profound change in the electroencephalogram.

7. In 16 patients with convulsive disorder and concomitant electroencephalographic findings, hypnotic activation technics failed to precipitate seizures and produced no changes in the electroencephalogram or recall of pertinent material in connection with their seizures. However, the trance often yielded a more relaxed state and consequently a better technical record.

8. In 10 patients referred for electroencephalographic examination because of seizures, hypnotic activation technics both induced and ended their spells without any change in the electroencephalogram.

9. Hypnosis during electroencephalography is useful in attempting to distinguish between psychogenic and organic convulsive disorders.

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A UNITARY HYPOTHESIS OF DISORGANIZATION: STRESS-ORGANISM RELATIONSHIPS

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The scope of modern medicine has increased to include a group of diseases characterized by apparent mind-body interaction—the psychosomatic disorders. Further, it is increasingly recognized that there are factors operative in routinely described diseases which are not subserved under conventional concepts of etiology, pathogenesis and pathology. The problem of mind-body interaction is significant not only for clinical problems but also as a theoretical basis for the psychological sciences.

It is a striking observation that wherever data relevant to mind-body interaction are sought, they are almost invariably found, but rarely in a form allowing for description of integrated activity. The current problem may be stated briefly: How may one integrate data pertaining on one hand to a material, structured, spatially organized area—the soma, physiologic systems, etc.—with a non-structured (or differently structured) non-spatial, non-material area—the psyche, mind, etc? As is well known, this is a crucial problem in psychosomatic hypotheses.

The Problem

The problem of the mind-body dichotomy has been termed the Cartesian problem, not so much because Descartes initiated it, but because the classical dichotomy was codified as a basis of a biologic and psychologic philosophy coincident with Descartes. Many solutions for the Cartesian problem have been formulated as descriptive hypotheses of observed sequences in psychosomatic disease. Inspection of these hypotheses: psychophysical parallelism, mind-body interaction or transaction, physical or psychical primacy in special situations, etc., reveals that the basic problem of the separation of two dissimilar spheres of organismal activity persists. The general form of the unsuccessful descriptions remains the same, that of two widely-separated spheres of experience and activity, though the description of the type of interaction varies.

It is a contention of this paper that there is no possible solution of the problem stated in terms of an interaction between structurally diametrically opposite areas of experience and activity. Rather, it is suggested that the initial question be rephrased: How may one describe the relationship between the class of data termed psychologic and the class of data termed physiologic? This paper is devoted to an exploration of one of the many possible theoretical frameworks which may be constructed.

Though it is not the purpose of this paper to consider the historical, cultural and psychological development of the mind-body dichotomy, brief reference to some aspects of the dichotomy as it is now operative is pertinent. Initially it may be stated that the mind-body dichotomy may be looked upon as little more than a convention, for which we have little supporting data, but nevertheless a convention with profound affective significance. Data are gathered, described and communicated in dichotomous terms. Concepts of self, both interpersonally and integrating and organizing internal experiences are couched in the mind-body dichotomy. This convention may even be adopted earlier than language use inasmuch as the psychomotor responses of a mothering figure are mediated through her understandings of the communication and needs of the infant. Though the mind-body dichotomy is culturally sophisticated, it is probably currently ontogenetically archaic. Interpersonal communication and much of our inner sensual, conceptual and perceptual organization are probably mediated, among other things, through the mind-body dichotomy. It might be guessed that problems engendered through avoidance and relinquishment of such communication techniques would be significant.

At first glance, the suggestion that the conventional and time-honored dichotomy be avoided might raise concern that resulting descriptions could hark to pre-Cartesian concepts with attendant magical and mystical confusions. However, the need for descriptions

of integrated organismal activity has developed from data derived from classical dichotomous techniques. Not until sufficient data were gathered in classical terms did the necessity of some derivative system develop. Furthermore, the avoidance of the concepts that there are two spheres of organismal activity does not imply that a less rigorous system be substituted. It is suggested that the series of data relating to classical mind-stuff not only operate lawfully, but lawfully within a whole and integrated organism. In summary, to avoid the classical concept of mind-stuff and its reciprocal, mechanical or isolated somatic activity, does not make the organism's experience less knowable, but allows for an understanding of what is becoming increasingly apparent—that there are extremely wide parameters of growth and development in the individual organism.

The Model Organism

For purposes of terminologic and conceptual simplicity and rigour, a hypothetical model organism is considered in the framing of these hypotheses, which has the following characteristics:

(a) The organism is considered to be a structured focus of organization within an environment.

(b) The structure of the organism is considered to be ultimately a space-time structure. Behavior, affect, adaptation, memory, communication may be considered as structured configurations in space and time simultaneously.

(c) Within limits, the structure of the organism is considered to be continuous in time.

(d) The organism is considered to be structured as a unit. Organismal activity is considered to occur as total unit activity at any instant in time.

(e) The structure of the organism is considered to be such that disorganization may occur, either total or in varying degrees.

(f) The organism occurs within and as a part of an environment. This chaotic environment is characterized by randomly occurring events. An event is considered to be any change within the environment which may be communicated to the organism.

(g) The organism is considered to be capable of multi-leveled intercommunication with the environment.

(h) The model organism is considered to use symbolic activity.

(i) It is assumed that conventionally recognized changes in the organism may be identified as expressions of or reflections in the spatio-temporal configuration of the model organism.

In evaluation of change within and without the model organism, a series of adjunctive concepts are utilized, in order to avoid the classical mind-body dichotomy:

(j) The model organism is considered not to function dichotomously in relation to external events.

(k) Change, as identified in sequence, is considered to be non-causal. Sequential process association of change is considered relevant.

(l) Change is considered to be non-linear, inasmuch as the organism is considered to be multi-leveled, multi-dimensional in space and time, simultaneously.

(m) Change in the spatio-temporal configuration of the organism is considered in non-dichotomous, non-valued terms.

(n) The concept of a non-material mind-stuff is not used. In its place is used the description of spatio-temporally recognized change, with consideration of symbolic activity as a process derivative of more primitively structured activity, and as a function of high level organismal integration through communication.

(o) The basic structural determinant emphasized here is the organism's change in time or, more precisely, the time flow sequence. This and the preceding descriptions are presented with understanding that other descriptions are neither less real nor less problematic, but the use of conventional psychologic and somatic terminology precludes an integrated description of organismal activity.

Hypotheses

1. *The organism and the environment exist as a structured continuum in space and time.* It is important to note that space-time structure refers to the configuration of the organism in spatial and temporal modalities simultaneously. The organism is considered to be an area of organization of the environment and

environmental data. Conversely, it may also be considered as an area of structuring of the environment which occurs at high levels of organismal integration. Environment refers to all that is not the individual organism. Continuum is used in the physical sense, with the addition that there is not only constant intercommunication within such a continuum, but there is also mutual reciprocal structuring by the organism and the environment. The organism is characterized by multi-dimensional organization. The environment (from the viewpoint of the organism, here termed organismal reality) may be considered as essentially chaotic. The organism is considered to be a single unit of structure within the environment with activity described as total unit activity. Conventionally described psychologic processes are considered to be derivatives in the process of two occurrences. First, they are derivatives of more purely somatic activities, and second, expressions of complex organismal integration, activity and communication, which in higher mammals are classed as symbolic activity. All these activities may be looked upon as structuring of the environment by the organism. These labels are also considered to be abstractions of the temporospatial configuration of the organism.

2. *The organism exists at a unique level of abstraction in this continuum—the organismal level.* The organismal level refers to total unit activity of the organism within an environment, as identified in changes in the time flow sequence. There are many currently accepted levels of abstraction of data pertaining to the organism. These are:

(a) The cellular level.

(b) The level of both physiologic organ and organ systems and psychologic intrapsychic systems. This is the level at which the mind-body dichotomy occurs.

(c) The organismal level.

(d) The interpersonal level of organismal interaction in a two-group.

(e) The suprapersonal level of the ascending hierarchy of groups of increasing complexity.

The organismal level of activity is considered to be the highest level of individual activity at which intraorganismal change (any type) occurs. The area of change and integration between the various intraorganismal systems and the two-group is the organismal area. Furthermore, the organismal level is considered to be the level at which integration/disorganization may be identified. Also, this level is considered to be that at which symbolic activity occurs and is communicated. It is thus hypothesized that psychosomatic change would be identified only at this level.

The organismal level is also the level at which processes such as shifting epiphenomena from the psychologic to the physiologic sphere, and *vice versa*, are communicated to the observer (i.e., either internally, the self; or externally, interpersonally). This is also the level at which the psychosomatic sequence is most clearly seen. The psychosomatic sequence may be described as: Non-simultaneous and dissimilar (physiologic and psychologic) change in sequence occurring in a unit organism progressing in the time flow sequence in relation to a single configurational experience. The only value of psychosomatic data lies in the elucidation of this characteristic sequence, which lies at the basis of data pertaining to the integrativeness of biologic data.

3. *Disruption of the organism-environment continuum occurs externally and moves towards the organism, providing communication occurs.* The following is considered to be a general form of organismal experience: The occurrence, peripheral to the organism, of an event which results in some change in the organism. The external event, the disrupting factor in the organism-environment continuum, is considered to be circumscribed in space and time. From the viewpoint of organismal reality this is so of necessity, for if there is not sufficient adaptation to preclude further communication, severe disorganization will occur, which also limits communication. A primitive but significant construct of organismal life is thus illustrated. That external reality (as seen in organismal reactivity) is a function of the structure of the organism at any instant in time. Note that this is not to say that physical reality is so structured. This is of importance inasmuch as it implies that the results of the communicated event will occur as a result of organismal structure, as well as the structure of the communicated external event. This implied structuring of the environment in the

psychosomatic sequence is well illustrated in the following areas of data:

(a) Culture history, with changing concepts of external physical reality.

(b) In child development, where there is rapid change in concepts of the outer world.

(c) In various types of psychopathology there is a well-known change in the concepts of the outer world.

(d) In psychosomatic medicine, the unusual reactivity of the organism (as seen in hyperfunctional disease) implies a somewhat unusual conception (at the organismal level) of the environment. These concepts were precedingly described as organismal reality.

Communication of an external event is considered to have occurred only if there is a change in the organism. With awareness of an event (conceptually, perceptually, reactively, etc.) there has been, in effect, in terms of response and structure of the organism, a movement of the event towards the organism in its time flow sequence. Furthermore, if there is change in the structure of the organism in the time flow sequence as a result of the communication of the external event, we may say that there has been an internalization of the external event. This is, in one sense, only a figure of speech since we would not expect the structural change in the organism to be the same as the structure of the external event. In cases where there is internalization of an external event which may be classed as physical or chemical, such as a bacterium or toxin, there is a response of the organism, and a change in the organism's space-time structure which is non-identical with the structure of the original external event. In the area of communication of interpersonal events, there is perhaps the closest approximation of structure between the original external event and the internalized new structural determinant. In summary it is important to note that this is essentially a description of change of locus within a field. There is seen to be movement of an event, a locus of change, from a relatively undifferentiated area—the environment, to a highly differentiated area—the organism. Consequently, upon movement of the area of the event, the internalized event would be expected to possess a now dissimilar structure.

4. *The movement of the disorganizing external event to the organism is termed stress, providing internalization occurs.* In physics the relationship of stress-strain is at least conceptually simple. However, in terms of the organism there is the added problem of structured communication, without which there is no stress. Further, the organism may react to stress with disorganization, adaptation, etc., all of which, from the viewpoint of organismal reality, tend to change the configuration of the stress. Essentially there is no stress unless there is change in the organism's space-time structure. Or more accurately, there is no stress unless there are communication and internalization of the event. Conversely, if there has been change within the organism—environment continuum, such that there has been change in the organism's configuration, stress has occurred. It is readily seen that any force, change, communication, or perception, etc., which meets the above requirements, may be termed a stress. Stress is thus seen to be a frequent and essential general form of organismal experience. Further, this communication with stress need not be considered as instantaneous, inasmuch as there is a necessary time duration for organismal process change. Presumably, a measurable period of time transpires during stress. Integration of the organism is thus not a thing-in-itself, but rather is inferentially determined in terms of deflection of growth and adaptation in the time flow sequence, as well as in terms of the nature and amount of disorganization which occurs in relation to an external event and its subsequent internalization.

5. *A circumscribed random event, internalized through stress, becomes continuous in the organism in the time flow sequence.* A basic assumption is that the organism's structure is continuous in time. It would thus appear that deformation of structure which results from internalization of the event would also be continuous in time. Thus the new structural determinant would be expected to be continuous and to play a role in the growth of the organism, the response to new stresses, and so forth. This is illustrated in the role played by previous experience in interpersonal relations, in the structuring of sensory inflow in development, in the emergency reactions appearing in psychopathology, in psychosexual development, in the genesis of the "psychosomatic constitution," in short, in all organismic integrative

ontogeny. This is also clarified in studies of physiologic response to stress as modified by previous stresses, etc. It is important to note that the internalized event becomes profoundly changed in its structure, as a result of subsequent growth and adaptation, as well as subsequent contact with stressors.

6. *The continuous internalized event, recognized as deformation of the structure of the organism in space-time, is analogous to the host-parasite relationship.* The host-parasite relationship meets the following requirements: External event, communication, stress and internalization, with the parasite becoming temporally continuous with the host organism. This same structure is seen in tumor, degenerative disease, non-specific inflammations, as well as in psychopathology and psychosomatic disease. It is readily seen that internalization of the parasite has immediate consequences in organismal integration, as well as consequences in terms of deflection of subsequent growth and adaptation. As is well known, an analogous situation operates in psychopathology. Further, an internalized event thus becomes "alive" in the sense that it forms a part of the organism's space-time structure. In effects upon the organism, such an internalized event may be "parasitic" in that dissociation, repression, inefficient or lethal adaption psychosomatically, etc., may occur. A significant fact to note with the consideration of the general aspects of such change is that the maximal area of change may be temporal, with minimal spatial (conventional pathologic) change.

The host-parasite analogy is valuable not only to illustrate the simplicity of form, and frequency of this type of experience and response, but also because the host-parasite relationship is the most studied and best known case of the stress-organism relationship. Presumably this is not only due to the necessity of such studies, but also to the ease with which the particular event (the microorganism) can be handled, isolated, and evaluated. Needless to say, in the psychosomatic sequence, neither the event nor the response is so readily identified.

7. *The conventional host-parasite relationship is a special case of the more general form: the stress-organism relationship.* It may be stated that all stressful experiences, dichotomously described or not, equal stress as defined herein, occurring as change of organismal temporospatial configuration. The consequences of these configurational changes may also be equivalent. All external events which are stressful partake of the general form: event—communication—stress (internalization)—disorganization—adaptation. These events may be placed in any of the conventional classes of events—psychologic, physiologic, or psychophysiologic, with the occurrence of this general form. The occurrence of this general form of organismal experience is of little practical significance except in those situations in which the psychosomatic sequence is found. In such a case it is then important to realize that under primitive conditions it is possible to recognize non-simultaneous, dissimilar responses (psychologic, physiologic) to a single disorganizing, originally external, event. In all such cases it would also be expected that there would be special responses which would be solely determined either by the nature of the event or the unusual structure of the organism.

8. *An aspect of this general form of experience of the organism is recognizable in distortion of the organism's structure in the time flow sequence.* In identifying this it is important to note that for immediate purposes, function may be considered to be structure in time. Thus, the spatiotemporal configuration of the organism may be considered to be equivalent with purposes, behavior, functions, and so forth. Aside from illustrating the basic premises of this paper, such a definition has a further value in the recognition of pathology. If the activity of the organism is considered to be unit activity and continuous in time, then pathology would be found expressed in the configuration of the organism in the time flow sequence. The clearest examples of this are seen in psychiatric illness, where there may be no conventional spatial analogues of pathology, and which is found to be predominant in the time flow sequence. This is also readily illustrated in psychosomatic illness where there is a continuum of non-simultaneous change which eventuates in a pathological immediate static spatial structure. This discussion suggests a definition of psychosomatic pathology: If behavior is considered as a sequence of patterned temporal dimensional structures (i.e., an abstraction of the progress of the organism in the time flow sequence), there are thus possible

descriptions of parameters of function. Pathology could then be described as an area beyond these limits. A further derivative is that pathology, regardless of the initial etiology, is seen as equivalent, for the final effect is found in the configuration of organismal integration in the time flow sequence.

9. *Conventional classes of organismal response—psychologic, physiologic, and psychophysiologic—are related in terms of the structural equivalencies outlined herein.* If the organism functions in total unit activity, then, at an undifferentiated level—the level at which psychosomatic disease occurs—we would expect these classes of response to be identical. It has been seen that in terms of the general sequence of external event—communication with occurrence of stress—internalization with subsequent disorganization and adaptation, these classes are identical. There is a great deal of evidence to suggest this: The whole class of psychosomatic illnesses, the affective responses with drugs, the integrative disorders with brain damage, profound physiologic changes identified in schizophrenia, physiologic changes noted with interpersonal change, etc. The series of organismic experiences described as the psychosomatic sequence is the classic example of these equivalencies of response, in which there may be seen a rapid shifting from one sphere of communication to another. It is concluded that on a theoretical basis as outlined in the structural sequence described in this paper, this equivalency exists.

Discussion

The problem of the mind-body dichotomy is briefly reviewed, with suggestions for an alternative framework of hypotheses. Some of these hypotheses are illustrated in order to describe stress-organism relationships as a general experience form of the organism. On the basis of the identical form of response of the organism to a wide variety of stresses, it is theorized that conventional classes of response of the organism are related equivalently. The classic series of changes seen in psychosomatic disease, described as the psychosomatic sequence, are described as a typical example of this type of organismal experience. Possessing such a framework, it is then possible experimentally to more accurately delineate unit organismal total activity associated with stress. Assumed unrelated changes in many spheres of organismal activity may be discovered to be closely related.

Conclusions

1. The organism may be described in nondichotomous terms.

2. Stress-organism relationships may be viewed as a general form of organismal experience.

3. On the basis of the above, the conventional classes of data pertaining to the organism, psychologic, physiologic, and psychophysiologic may be viewed as equivalent, but non-simultaneously, as measured with current techniques.

4. It is concluded that consideration of the organism at a special level of abstraction, the organismal level, is necessary to conceptualize integration and evaluate the psychosomatic sequence.

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SPONTANEOUS SEIZURES AND RELATED ELECTROENCEPHALOGRAPHIC FINDINGS FOLLOWING SHOCK THERAPY[1]

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Spontaneous seizures followng the various shock therapies for mental disorders present a disturbing, although fortunately rare complication. The total number of reported cases, including related electroencephalographic studies, is quite small. In the following chronological review of the literature, pertinent electroencephalographic findings will be given whenever cited in the original articles.

Review of Literature

In 1938, Mezei (13) reported two cases of epilepsy following metrazol treatment. In 1940, Hartenberg (6) described three spontaneous seizures in one patient, beginning several months after a course of metrazol therapy. Read (16) reported four patients with one to three late epileptiform seizures subsequent to metrazol treatment. The post-shock EEG in one patient showed "characteristic spindles as seen in grand mal epilepsy." In 1941, Bellet *et al.* (1) described a series of major convulsive seizures in one patient an hour after receiving electroconvulsive treatment (ECT). Mayer-Gross (12) noted three major fits ½–18 hours after failure to elicit a convulsion with ECT.

In 1942, Levy *et al.* (10) reported a patient who had two generalized epileptiform convulsions several weeks after having received two ECT. The post-shock EEG showed "some disappearance of alpha waves and moderate delta activity but no 3 or 4 per second waves or other cerebral dysrhythmia suggestive of an epileptic disturbance." Liebert (11) described a group of eight patients who had from 9 to 53 epileptic convulsions three months to two years after metrazol therapy. The post-shock EEG's showed "a large variety of changes which are usually seen in epileptic disorders." Parfitt (15) noted that his patient had convulsions during infancy. He received 10 ECT and 63 IST (insulin shock treatments), experiencing many spontaneous seizures commencing 17 days after cessation of therapy.

Pacella and Barrera (14) reported a patient who had generalized convulsions four weeks after a course of 16 ECT. The pre-shock EEG showed "diffuse abnormality consisting mainly of high amplitude 4–6 cycle per second potentials over the entire cortex." The post-shock EEG indicated an "increased degree of abnormality with much serial 3–4 cycle per second activity." In 1944, Terpstra (19) described a case of status epilepticus following ECT. In 1945, Pacella and Barrera (14) reported a second patient who had a generalized convulsion eight weeks after having had 20 ECT and 21 IST plus 7 combined treatments. The pre-shock EEG showed "diffuse abnormality consisting of a dominant rhythm of 7 cycle per second waves over the entire cortex." The post-seizure EEG indicated "marked diffuse abnormality consisting of much serial high amplitude 3–4 cycle per second waves over the entire brain." These authors stated that none of their group of 500 patients with normal EEG's exhibited spontaneous seizures.

Six patients were described by Hedegaard and Hjerrild (7) as having experienced many grand mal, epileptiform and petit mal-like seizures 40 hours to 14 months after having had 15 to 58 cardiazol injections, 58 to 131 IST and 7 to 148 ECT. In 1946, Krane (9) reported four patients with spontaneous epileptiform attacks after prolonged cardiazol therapy. Terruwe (20) described a case of convulsions beginning two weeks after last ECT (#45). This author quotes Hardoni (5) as having observed an epileptic attack two days after the last IST. In 1947, Folkson (4) cited a case of death following status epilepti-

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The statements and conclusions published by the author are the result of his own study and do not necessarily reflect the opinion or policy of the Veterans Administration.

cus, which had begun one hour after failure to elicit a fit with ECT. In 1949, Schumacher (18) found four cases of epileptiform seizures following ECT.

In 1953, Blumenthal (2) reported a case of convulsive disorder following ECT. The post-seizure EEG was abnormal, manifested by a moderate "build-up" with hyperventilation. Revitch and Luzzi (17) found two patients with seizures following extensive ECT. The post-seizure EEG's demonstrated temporal lobe abnormalities. In 1954, Floss (3) (paper abstracted in the Journal of the American Medical Association July 10, 1954) described epileptic fits, including one death, in nine patients who had received 73 to 493 ECT and at least 28 pentrozol treatments each.

Case Material and Analysis

1) *Correlation of spontaneous seizures and electroencephalographic findings following shock therapy.* In this paper I am presenting the case reports of 12 schizophrenic male patients who experienced spontaneous seizures following shock therapy. Except for one patient on trial visit (Case 11, G. S.), these patients are presently at the Veterans Administration Hospital, Northport, New York, a 2,400 bed hospital. All of them are veterans of World War II or the Korean conflict except for one World War I veteran (Case 1, J. B.). With one exception (Case 6, A. McK.) there is no family history of epilepsy. None of these patients ever had clinical seizures of any type in their personal history. However, following one or more of the various shock therapies, each patient experienced spontaneous convulsions for the first time.

Six of the 12 patients had no available pre-shock electroencephalograms (EEG's), having received treatment at various military installations or state hospitals previously. Four patients had normal EEG's prior to either the first or second course of electroconvulsive therapy at Northport. One patient (Case 5, J. L.) had an abnormal record, and another patient (Case 12, J. T.) had a mildly abnormal EEG prior to treatment at Northport.

Following onset of seizures, eight patients had abnormal records and one patient (Case 9, J. R.) a mildly abnormal EEG. Of the eight abnormal tracings, six were found to be focal, generally in either anterior quadrant; one (Case 3, J. H.) was classified as a paroxysmal record, grossly abnormal; and another (Case 4, F. J.) as an abnormal sleep record. Three patients, including the one with an abnormal pre-shock EEG, had post-seizure tracings interpreted as either normal or within the limits of normal variation. With one exception (Case 3, J. H.), all records from this hospital were taken with a 6-channel Model III or 8-channel Model III or III D Grass Electroencephalograph. Both the collodion and bentonite techniques of electrode placement were utilized.

2) *Type and amount of shock therapy.* It will be noted that each of the 12 patients in this series received electroconvulsive therapy (ECT). The machines used were the Rahm, Lektra, Offner slow rise electro-shock apparatus and, most recently, the Reiter electro-stimulator. Six patients also received insulin shock therapy (IST), while one patient (Case 8, H. Q.) had ECT, IST and metrazol. The smallest number of treatments in this series amounted to 11 ECT (Case 11, G. S.). The largest number of electroconvulsive treatments alone totalled 192 (Case 10, M. S.). The greatest amount of IST plus ECT received by any one patient amounted to 172 and 146 treatments, respectively (Case 5, J. L.). Six patients received over 100 ECT; two of these patients (Cases 2 and 5) also had over 100 IST.

The average number of treatments up to the last spontaneous seizure for the 12 patients receiving ECT was 92 and for the 6 patients receiving IST was 73. If the amount of ECT between the first and last spontaneous seizures is deducted (Cases 1, 2 and 5), the average number of electroconvulsive treatments prior to the first spontaneous seizure was 71.

3) *Total duration of shock therapy.* The shortest duration of treatment was 5 weeks (Case 11, G. S.); the longest, 8 years (Case 9, J. R.). The total duration of shock therapy up to the time of the last spontaneous seizure averaged 3 years and 5 months. Three patients (Cases 4, 5 and 11) have had additional ECT without further spontaneous seizures up to the time of writing.

4) *Time between last treatment and onset of spontaneous seizures.* The briefest period of time between the last treatment and first

spontaneous seizure was 12 hours (Case 5, J. L.), the lengthiest 11 months (Case 6, A. McK.). Paradoxically, the latter patient was the only one with a familial history of epilepsy. The average period of time elapsing between the last shock treatment and the first spontaneous seizure averaged 2½ months for the entire group of 12 patients. No positive correlation could be ascertained between the amount of treatment and time of onset of the first spontaneous seizure.

5) *Type and number of spontaneous seizures.* Each patient in this series experienced spontaneous grand mal seizures subsequent to shock therapy. The lowest number of such seizures was one, occurring in a patient (Case 11, G. S.) who also had the smallest number of treatments. The largest number of seizures, approximately 43, was experienced by the only patient (Case 6, A. McK.) with a history of epilepsy in the family. The average number of grand mal seizures for the entire group of 12 patients was seven.

Two patients (Cases 2 and 12) had epileptiform seizures provoked by hyperventilation during recording of the EEG, as will be noted in further detail below.

One patient (Case 12, J. T.) with a history of intracranial injury in the right temporal area experienced psychomotor seizures in addition to generalized convulsions.

6) *Total duration of spontaneous seizures.* The shortest period of spontaneous seizures was one day, occurring in two patients (Cases 10 and 11). The longest period was 3½ years, the latter in a patient (Case 6, A. McK.) with a familial history of epilepsy. The total duration of spontaneous seizures for the entire group of 12 patients averaged one year.

Case Reports

Case 1: J. B., 55, schizophrenic reaction (hereafter called "s.r."), catatonic type. Had 21 electroconvulsive treatments (ECT) ending July 27, 1949. First seizure Jan. 8, 1950, a second on May 15, 1951. Then had a total of 158 ECT up to July 2, 1954. Final seizure—August 22, 1954. *EEG* 2 days later: Abnormal-slow, focal-left temporal area (fig. 1).

Case 2: F. D., 24, s.r., catatonic. Had insulin shock therapy (IST) in 1950. From Dec., 1952, to June, 1953—70 ECT. A second course of IST was discontinued on Sept. 8, 1953. First seizure a week later. *EEG* same day: Abnormal, indicative of epilepsy,

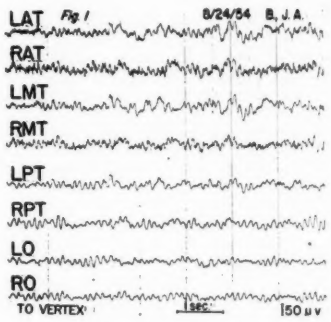


Fig. 1. (Case 1)—Patient had 179 electroconvulsive treatments (ECT) prior to third and last spontaneous seizure on August 22, 1954. EEG taken 2 days later was abnormal-slow, focal-left temporal area.

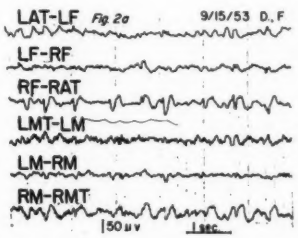


Fig. 2. (Case 2)—Patient had 70 ECT plus 2 courses of insulin shock therapy (IST) prior to first spontaneous seizure on Sept. 15, 1953. During recording of the EEG the same day, an epileptiform seizure was provoked by hyperventilation (HV), as noted below:

(a) Irregular, positive spike and slow wave activity, most prominent in the right frontal-anterior temporal area, prior to HV.

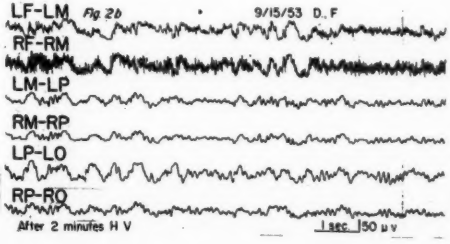
(b) Marked, generalized slowing best seen in the left parietal-occipital area after 2 minutes HV.

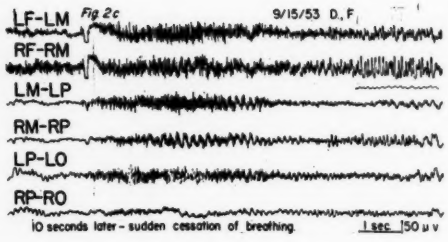
(c) 10 seconds later, sudden cessation of breathing with production of continuous big spike activity in the right frontomotor area.

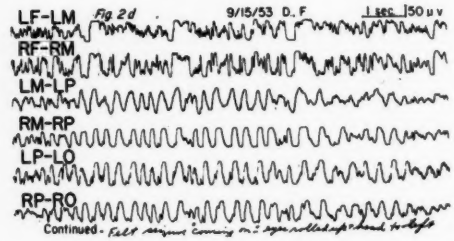
(d) Immediately afterward, patient felt seizure "coming on." Eyes rolled up and head turned to left. EEG shows predominant, generalized high voltage 4 per second waves preceded by small spikes.

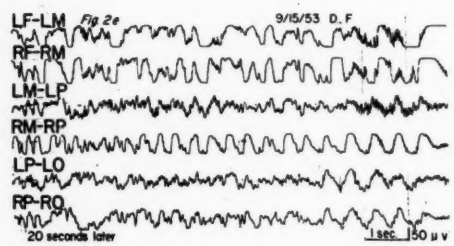
(e) 20 seconds later, continuation of seizure, slow wave activity more prominent on the right.

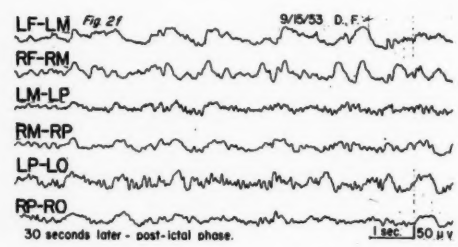
(f) 30 seconds after (e), post-ictal phase.











grand and petit mal types, with a focal onset in the right anterior quadrant (fig. 2a–f).

Patient then had 31 ECT ending June 2, 1954, with a second seizure nine days later.

Case 3: J. H., 35, s.r., catatonic. Had 15 IST and 36 ECT, the latter ending Oct. 13, 1944. First seizure—Feb. 5, 1945. *EEG* 15 days later: Paroxysmal record, grossly abnormal. During the next two years had 15 spontaneous seizures.

Case 4: F. J., 26, s.r., chronic undifferentiated type. Had 37 ECT ending Aug. 8, 1949. First seizure Sept. 8 and a second Sept. 22, 1949. EEG 11 days later: Not satisfactory, but no definite abnormalities. *EEG*—Nov. 16, 1949: Abnormal sleep record, temporal spikes and diffuse 6 cycle paroxysmal. Had 22 ECT in 1954 with no further spontaneous fits.

Case 5: J. L., 31, s.r., paranoid. Pre-shock EEG in 1947: "Pathological in all areas except occipital." Received 3 courses of IST and 87 ECT, terminating May 31, 1952. Had 2 spontaneous seizures that evening. Then had 59 ECT ending June 19, 1953, followed by seizures on August 14 and 31, 1953. Seven more ECT were given with no further seizures. *EEG's:* All within limits of normal variation.

Case 6: A. McK., s.r., paranoid. Oldest sister, 46, epileptic. Mother had diffusely abnormal-slow EEG with no history of fits. Patient himself had no history of injuries or convulsions. Received 24 ECT and 46 IST, the latter discontinued on May 22, 1947. Had first seizure while on trial visit in April, 1948, with an average of one seizure monthly thereafter for 3½ years. *EEG's* repeatedly showed an "S-2 focus in the right temporo-occipital areas."

Case 7: J. P., 31, s.r., catatonic. Had 45 ECT ending Sept. 7, 1951. First seizure on Jan. 21, 1952, a second on March 18, 1952. *EEG* that day: Abnormal-slow, focal-left frontal area, extending posteriorly (fig. 3).

Case 8: H. Q., 27, s.r., paranoid. Received 23 metrazol, 74 IST and 133 ECT, the latter terminating on June 11, 1954. Seizures occurred on August 26 and 27, 1954. *EEG* 2 weeks later: Essentially normal.

Case 9: J. R., 38, s.r., catatonic. Had a total of 124 ECT, ending August 6, 1952, followed by 2 spontaneous seizures August 23, 2 on Sept. 19, and another Sept. 20, 1952. *EEG* Dec. 16, 1952: Mildly abnormal, consistent with post-ECT.

Case 10: M. S., 33, s.r., catatonic. Received a total of 192 ECT, discontinued August 30, 1954. Had 2

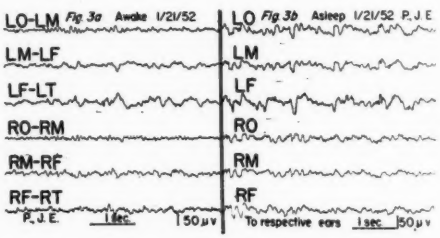


FIG. 3. (Case 7)—Patient had 45 ECT prior to first spontaneous seizure on January 21, 1952. EEG taken same day is abnormal-slow, focal-left frontal area, extending posteriorly, both awake (a) and asleep (b).

spontaneous seizures Sept. 18, 1954. *EEG* Nov. 10, 1954: Abnormal-slow, focal-left anterior quadrant, probably due to recent ECT (fig. 4).

Case 11: G. S., 26, s.r., catatonic. Had 11 ECT as of June 17, 1953, followed by a seizure June 23, 1953.

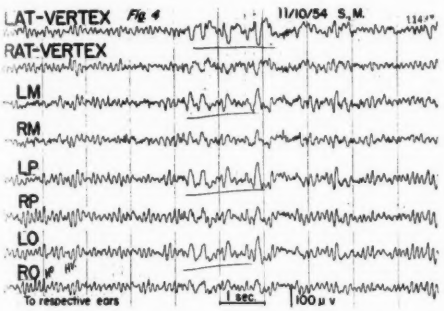


FIG. 4. (Case 10)—Patient received 192 ECT prior to 2 spontaneous seizures September 18, 1954. EEG taken on November 10, 1954, is abnormal-slow, focal-left anterior quadrant.

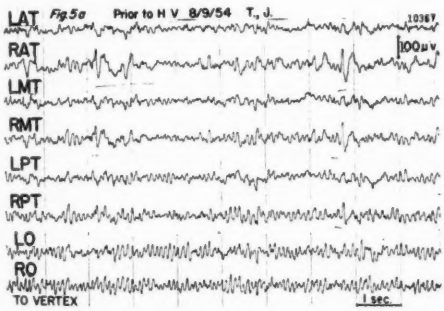


FIG. 5. (Case 12)—Patient had an intracranial injury following a questionable skull fracture in 1946. Received 11 IST and 64 ECT, ending June 30, 1954. During a routine EEG taken on August 9, 1954, prior to onset of spontaneous seizures, an epileptiform attack following hyperventilation was observed both clinically and electrographically, as noted below:

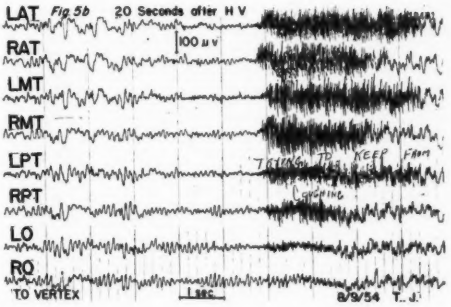
(a) Very high voltage diphasic spike and 3 per second waves, originating in the right anterior temporal area, prior to HV.

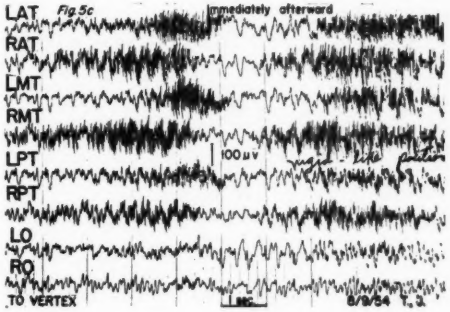
(b) 20 seconds following HV focus has shifted to involve left anterior temporal area. Muscle artifact caused by patient trying to keep from coughing.

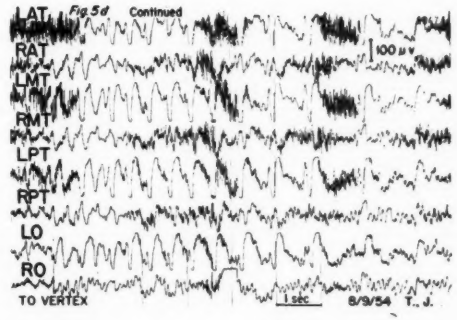
(c) Continuous recording. Patient has assumed a "rigid-like position." Note generalized slowing with a burst of 5 per second wave and spike complexes in the left occipital area.

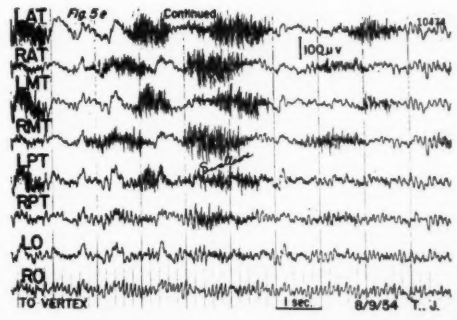
(d) Continuous recording. Ten-second run of 200 microvolt, 2 per second wave and spike formations predominantly in the left hemisphere.

(e) Continuous recording. Post-ictal phase. Muscle artifact caused by swallowing.









EEG 3 days later: Within normal limits. Received 34 ECT subsequently without further attacks.

Case 12: J. T., 30, s.r., hebephrenic. In 1946 sustained a questionable skull fracture of the right squama temporalis with evidence of intracranial injury. Preshock EEG in 1951 was mildly abnormal, without any focal or lateral features. Received a total of 11 IST and 64 ECT, the latter ending June 30, 1954. Routine *EEG* on August 9, 1954: Abnormal-focal, right anterior temporal area, probably caused by recent ECT, although may be due to head injury (1946). During the recording an epileptiform attack following hyperventilation was noted both clinically and electrographically (fig. 5).

On Sept. 17, 1954, patient experienced a psychomotor attack. A grand mal seizure occurred on Oct. 8, 1954. *EEG* same day: Abnormal, with focal tendencies bi-temporally, right more than left, consistent with exacerbation of previous head trauma by ECT. Another psychomotor attack was experienced on October 17 and a second grand mal seizure on October 23, 1954. Neurological examinations and pneumoencephalography have been normal.

Discussion

There is still a good deal of controversy as to whether or not convulsive therapy may lead to spontaneous epilepsy. According to Kalinowsky and Hoch (8) the vast number of patients treated with ECT during the last ten years have not shown epileptiform symptoms. These authors express the view that in the practical absence of such reports, spontaneous epilepsy as a consequence of ECT need not be feared. In this paper I have presented 51 cases appearing in the literature, in addition to which 12 new cases have been described. To be sure the total figure does not approach the reported incidence of epilepsy in the general population (0.5 per cent). Nevertheless the author is of the opinion, based on personal communication from others in the field, that the reported cases represent only a small portion of the actual figure. It is believed that a careful survey of the epileptic population of any hospital where a good deal of electroconvulsive therapy is administered would reveal a few cases of spontaneous seizures directly attributable to the treatment.

Another disputed question exists as to whether or not patients with normal pre-shock electroencephalograms may develop spontaneous seizures following therapy. Pacella and Barrera have stated that spontaneous convulsions following convulsive therapy are prone to occur only in those patients who have latent convulsive tendencies as revealed by the EEG. In this paper I have presented four patients who had normal electroencephalograms prior to the first or second course of electroconvulsive therapy at Northport and who nevertheless developed spontaneous seizures subsequently.

Another interesting and challenging result of this study is the fact that half of the 12 patients in this series developed focal EEG findings, concomitant with their spontaneous seizures, in either one or the other anterior head region. In only one case (no. 12, J. T.) was the cause for the focus quite obvious, namely the history of a questionable skull fracture in the right anterior temporal area with evidence of intracranial injury. The etiology of the focal abnormalities in the other 5 cases remains obscure. Consideration of possible causes includes the polarity of the applied electric current during therapy. However, since the foci were evenly divided as to lateralization, it is not believed that the polarity is a significant factor in the etiology.

The mechanism whereby these spontaneous seizures arise also remains obscure. Of possible significance is the fact that in most of the cases in this series the seizures generally occurred some time following termination of a prolonged course of ECT. In one case (no. 5, J. L.) they were observed during a course of ECT, occurring, however, only after the usual number of treatments had been doubled in the preceding 48-hour period. In this connection it is of interest that Hedegaard and Hjerrild noted, in their second case, a patient who had many petit mal-like seizures during a prolonged course of ECT, the tendency to spontaneous attacks subsiding when the shocks were given at longer intervals. From the prophylactic standpoint, it would therefore seem advisable that prolonged electroconvulsive therapy be tapered off gradually toward the end of a course so that treatments are given weekly, semimonthly and then at monthly intervals for some time in order to attempt to avoid the unfortunate occurrence of spontaneous seizures subsequently.

Summary

1. Case reports of 12 schizophrenic patients who developed spontaneous convulsive seizures

for the first time following shock therapy are presented. One patient, with a history of intracranial injury referable to the right temporal region, also experienced psychomotor seizures.

2. Of the 12 patients, one had an abnormal and another a mildly abnormal pre-shock EEG. Four patients had normal EEG's prior to the first or second course of electroconvulsive therapy at Northport; each of these patients had had treatment elsewhere without having pre-shock EEG's available. The remaining six patients either had no pre-shock EEG's or none that could be obtained immediately.

3. Following onset of spontaneous seizures, eight patients were found to have abnormal EEG's and one patient a mildly abnormal EEG. The remaining three patients had tracings within the limits of normal variation.

4. Of the eight EEG's interpreted as abnormal, six were found to be focal, evenly divided between the two anterior head regions; one was classified as a paroxysmal record, grossly abnormal and another as an abnormal sleep record.

5. With two exceptions, all of the nine patients with either abnormal or mildly abnormal EEG's presented normal tracings after a few months.

6. Two patients, including the one with a history of intracranial injury, developed epileptiform seizures clinically and electrographically following hyperventilation. It is believed that this is the first time such records have been demonstrated in patients experiencing spontaneous seizures following shock therapy.

Conclusions

1. This paper serves to confirm statements of previous authors that spontaneous seizures following shock therapy occur in a small percentage of patients.

2. Seizures may develop in patients who have had normal EEG's prior to successive courses of treatment.

3. The convulsive state is self-limited and is characterized in most cases by return of the EEG to normal, generally after a few months.

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VARIABLES IN THE CLINICAL EVALUATION OF A HYPNOTIC DRUG WITH A CLINICAL EVALUATION OF GLUTETHIMIDE[1]

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For a comprehensive evaluation of hypnotic drugs qualitative as well as quantitative features should be considered. In this study an attempt was made to evaluate some of the qualitative factors in the satisfaction obtained from hypnotically induced sleep and also to develop a methodology for a comprehensive investigation of hypnotic drugs. A new type of oral non-barbiturate hypnotic, glutethimide, α-ethyl-α-phenyl-glutarimide (Doriden, Ciba) was the principal hypnotic investigated. This study was carried out during 1954 at the Veterans Administration Center, Los Angeles, California.

Twenty-one patients were selected from the medical and surgical wards of the Veterans Administration General Hospital and four patients from the Veterans Administration Psychiatric Hospital.[4] All had previously been using hypnotics and required continued hypnotic medication. Patients ranged in age from 24 to 85 years with almost half of the group included in the 50–59 year age range. The patients showed a wide range of medical diagnoses, and many carried multiple diagnoses. Most patients were hospitalized with chronic physical disease.

Before their trials with glutethimide, all patients in the general hospital were seen by the junior examiner who asked for their cooperation in the evaluation of their sleep. They were told that the hypnotic which they had been receiving previously in capsule form would be given to them in tablet form during the study. Each patient was checked hourly during the night by a nurse or hospital aide, and his sleep charted from the first administration of the hypnotic to 7 a.m. the following morning. This was noted on a sleep chart following the outline recently described by May and Ebaugh. In most cases a control sleep chart was kept for a few days before the patient was placed on the experimental hypnotic and continued for a few days after the drug was discontinued. These serial sleep charts allowed a comparison of the patient's sleep habits before, during and after the experimental trials. On the sleep charts were noted time of onset and duration of sleep, interruptions of sleep, presence of pain, emotional disturbance and variations in the patient's clinical condition, medications given to the patient, and the patient's complaints and comments relative to his sleep and the hypnotic drug. In the morning a resident physician and the junior investigator questioned the patient about his sleep and made their own clinical appraisal of the patient's sleep. The patient's case history, clinical condition and current physical state were evaluated as to the possible effects of his physical disease or emotional disturbance on his sleep. The clinical data were correlated with the patient's subjective reports, and various facets of the satisfaction quality were isolated.

Onset of sleep was observed for both initial and repeat doses of the hypnotic. Onset was considered good if the patient fell asleep within one hour after the drug was administered and poor if delayed for more than one hour after administration of the drug. At the conclusion of each patient's trials the drug was evaluated for its effectiveness in inducing sleep. When the drug produced good onset in 75% or more of the trials, it was considered satisfactory; when it produced good onset for 50% to 75% of the trials, it was considered fair; and when it produced good onset in less than 50% of the trials, it was considered unsatisfactory.

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The evaluation of duration of sleep represented the effect of the total nightly dosage of the hypnotic drug. Duration was considered good if the patient had five hours of constant sleep or had a total of six hours of interrupted sleep. In the absence of either five hours of constant sleep or six hours of interrupted sleep, the trial was considered poor for duration. The effect of the drug on duration was evaluated at the conclusion of each patient's trials. When the drug produced good duration for 75% or more of the trials, it was considered satisfactory; when it produced good duration for 50% to 75% of the trials, it was considered fair; and when it produced good duration for less than 50% of the trials, it was considered unsatisfactory.

Each patient's subjective report of his hypnotically induced sleep was evaluated daily. The satisfaction quality of sleep was estimated from the patient's reaction to the onset, duration and other factors of sleep which had personal value to the patient. The nightly trials ranged from 5 to 41 days with a total of 455 nightly trials. Fourteen patients had trials of one to three weeks' duration, and 11 of the 25 patients had trials lasting three to seven weeks.

Glutethimide was dispensed in scored tablets of 250 mg. and 500 mg. In a preliminary survey it was found that a 250 mg. dose was insufficient for the production of hypnosis in male patients; therefore, male patients (except for one patient trial) were given initial 500 mg. doses of glutethimide. The total nightly dosages ranged from 250 mg. to 3,000 mg. There were 39 trials with single doses of 250 mg., 292 trials with single doses of 500 mg., and 9 trials with single doses of 1,000 mg. Repeat doses were given either for delayed onset of sleep or for interrupted sleep. Only one repeat dose per night was given to each patient. In approximately 25% of the nightly trials repeat doses in varying amounts were required. Repeat doses of glutethimide were required for 13 of the 25 patients who were given a total of 115 repeat trials.

TABLE 1.—EVALUATION OF ONSET AND DURATION OF SLEEP WITH GLUTETHIMIDE

Total No. of Patients (25 Patients)*	Dosage (I—Initial) (R—Repeat)	Total No. of Trials¶	Percentage of Patients Showing Satisfactory Sleep		Total No. of Patients Showing Side Effects
			Onset†	Duration‡	
	mg.		%	%	
5	250	39§	100	100	0
1	250 I, 250 R	1	0	100	0
21	500	292	52	91	3‖
9	500 I, 500 R	33	30	36	1
2	1000	9	0	90	0
3	1,000 I, 1,000 R	69	19	60	1
1	1,500 I, 1,000 R	8	0	0	0
1	1,500 I, 1,500 R	1	100	0	1
1	1,000 I, plus Chloral Hydrate R (1.0 to 2.0 gm.)	3	100	0	0

¶ 455 trials in the 25 patients (including 115 repeat doses) with 3 patients showing side effects on 500 mg. dosage and 2 showing side effects on massive dosage of glutethimide.

* Twenty-one males and 4 females.

† Onset of sleep was determined separately for initial and repeat doses.

‡ Duration of sleep was determined by adding the total number of hours of sleep produced by both initial and repeat doses given to the patient during one night.

§ All but one of these trials were with the 4 women patients.

‖ Two of the 3 patients showing side effects were women who appeared unreliable in their reports. Side effects in the other patient were also difficult to evaluate because of the patient's exaggerated reaction to pain.

RESULTS

Onset and duration. The clinical results are summarized in table 1. As the total nightly dosage of glutethimide increased, onset and duration became less satisfactory. This is illustrated by one male patient who had 26 trials with 500 mg. from which he obtained satisfactory onset and duration; but on 12 trials with 500 mg. repeat doses he showed only fair onset and duration.

In psychiatric patients heavy dosages of glutethimide were more likely to produce satisfactory onset than duration, although these psychiatric patients showed the poorest results of the entire group with respect to onset. Patients requiring total nightly dosages of glutethimide of more than 1,000 mg. were all psychiatrically disturbed; and with these patients the higher dosages usually did not produce satisfactory onset and duration of sleep. Clinical observation, nurses' notes and the patients' subjective reports were in agreement that the 500 mg. dosage was unsatisfactory for

onset or duration when patients were suffering from great pain or were in emotional distress. For these patients the addition of a mild analgesic or sometimes a narcotic helped produce more satisfactory sleep with the same dosage of glutethimide, although this was more beneficial to patients with physical pain than patients with emotional disturbance.

Side effects. Side effects from the use of glutethimide were reported in only a few patients' trials at which time the drug was either discontinued or the dosage reduced. Hangover effects were described as "feeling dopey, dizzy or groggy". There were no side effects from the 250 mg dosage. Only one of the male patients in the general hospital on a dosage of 500 mg. per night complained of hangover effects. This patient exaggerated all of his physical disabilities. The women who complained of hangover effects after a single dose of 500 mg., and reported side effects after a 500 mg. repeat dose, also had large emotional components to their physical complaints and at times showed manifest emotional disturbance. They were in close contact on the ward, and the influence of suggestion appeared high. Their complaints ceased when the dosage of glutethimide was reduced to 250 mg. Two of the four psychiatric patients on heavy dosages of glutethimide showed side effects. One patient who regularly received 1,000 mg. repeat doses for 41 trials, reported feeling groggy one morning, having a "cottony bad taste" and dryness of his mouth. These effects gradually diminished during the day and were not present following subsequent trials with the same dosage. The second psychiatric patient had no side effects with continued heavy dosage of glutethimide until he received 3,000 mg. during one night. With this high dosage he developed a clinically toxic state. On awakening he appeared very groggy and dopey; he was markedly confused, evidenced thick speech, unsteady station and unsteady gait. His memory was poor during the day, and he subsequently had no recollection of this confused period. He was still drowsy the following night when given 2,000 mg. glutethimide; but from this and subsequent trials with 2,000 mg. glutethimide he had no clinical toxicity or side effects.

Toxicity. Routine laboratory studies of blood and urine during and at the conclusion of the clinical investigation showed no evidence of toxicity due to glutethimide in any of the patients observed. In many instances laboratory findings showed pathological changes related to the underlying disease process, but in no case were these believed related to glutethimide. Laboratory studies on the one psychiatric patient who showed clinical signs of toxicity did not reveal evidence of toxicity. No cumulative effects were noted although most of the 25 patients were continued on glutethimide for 1 to 7 weeks, and 11 of the 25 received hypnotic doses of glutethimide for 3 to 7 weeks. Following the completion of the experimental trials three patients discontinued the use of hypnotics and reported no habituation to glutethimide.

Comparison with other hypnotics. The hypnotic effects of glutethimide were compared with the effects of other hypnotics by means of the patients' subjective reports and the objective records from their serial sleep charts. Most of the general medical and surgical patients were receiving 1½ grains secobarbital at bedtime prior to their trials with glutethimide, and the psychiatric patients were receiving 1.0 to 2.5 grams chloral hydrate with regular repeat doses in one to three hours. Generally the sleep charts showed that a 500 mg. dose of glutethimide was approximately equal in hypnotic effect to 1½ grains secobarbital. The onset of sleep was slightly slower with glutethimide, although onset with both was generally satisfactory and the duration was equally satisfactory to the majority of the patients. Although 500 mg. glutethimide appeared to approximate the hypnotic effects of 1.0 gram chloral hydrate in psychiatric patients, the effect from both drugs was so poor as to make the comparison valueless. Higher dosages of all hypnotics were required to produce hypnosis in patients as they became more emotionally disturbed. One psychiatric patient showed a paradoxical excitement reaction to one dose of glutethimide, but a 1,000 mg. repeat dose of glutethimide induced a rapid onset of sleep. In their subjective reports most patients appeared more satisfied with the onset of sleep with other hypnotics than with glutethimide. Only one patient reported that the onset of sleep was more rapid with glutethimide than with secobarbital. Most patients receiving glutethimide tended to be more

pleased with the duration than with the onset of sleep induced by this hypnotic. In their appraisal of the satisfaction quality of the various hypnotics, 13 of the 17 general medical and surgical hospital patients felt that sleep induced by glutethimide had a better satisfaction quality than sleep induced by other hypnotics. Reports such as "good satisfying sleep" and "good sleep without side effects" were made by these patients. Much favorable comment was based on the absence of hangover effects which they had frequently experienced. Two patients specifically noted the absence of the unpleasant "floating-off feelings" occasionally present with barbiturate induced sleep. The two women who reported side effects with glutethimide had experienced none with 1½ grains secobarbital and subsequently rejected glutethimide.

Evaluation of Subjective Reports and Conclusions

Difficulties in the evaluation of the hypnotic arose from the subjective aspects of the study and were increased by the individual and varied reactions of patients receiving hypnotics. Nevertheless, these qualitative aspects were considered essential for the clinical evaluation and, therefore, were correlated with the clinical data. Because subjective reports from the four emotionally disturbed patients in the psychiatric hospital were not considered reliable, they were not included. The most significant finding was the effect of peripheral factors on the satisfaction quality of hypnotically induced sleep. These factors not only differed from individual to individual but also varied in the same person. The satisfaction quality of sleep depended upon many individual factors other than the rapidity of onset and the duration. A "good night's sleep" to some patients meant "feeling more refreshed" on awakening or "in less pain", and to others it meant sleeping so heavily that they were not disturbed by loud ward noises, snoring of neighboring patients or disturbed by their own bodily discomforts. The personal significance attached to onset and duration varied considerably among patients and markedly influenced their satisfaction derived from sleep. A patient could be dissatisfied with the hypnotically induced sleep even though the sleep was rapid in onset, satisfactory in duration and without side effects. Generally patients in physical pain reported that a lengthy duration of sleep was more satisfying than a rapid onset of sleep. Patients with minimal physical pain frequently reported more satisfaction with rapid onset and less concern with duration. When either great pain or emotional disturbance was present, no dosage of hypnotic produced satisfying sleep.

The satisfaction quality of sleep appeared more closely related to the patient's clinical condition than to the dosage of hypnotic employed; it varied with periodic fluctuations in the patient's physical condition and feeling of well-being. Patients frequently were placed on their first hypnotic drug during the acute stage of their disease, early in their hospitalization. After they began to improve physically they were changed to glutethimide. This was not part of the experimental design but rather was related to general reluctance of the hospital staff to introduce an experimental hypnotic to a very sick patient. Many patients were favorably impressed by the satisfaction quality of glutethimide induced sleep. The possibility existed that some of their favorable impressions of glutethimide were more specifically related to their improved clinical condition and increased feelings of well-being than to the favorable hypnotic effect of glutethimide. An attempt to evaluate this factor was made by continuing the controlled observation of the patient's sleep after glutethimide was discontinued and the patients were returned to their previous hypnotics. Preference for glutethimide induced sleep was still expressed, but this preference was now weaker and less definite than previously. These factors have significance for the clinical comparison of hypnotics.

The presence of side effects affected patient's feelings of satisfaction about sleep. To some patients even mild hangover effects made them consider the sleep unsatisfactory, in spite of other satisfying features.

An attempt was made to overcome the patients' resistance to the change in hypnotics by the initial explanation that the "tablet was the same sleeping medicine they had been taking previously, but that it was now being given in tablet form." From an evaluation of

the patients' statements and attitudes it appeared that few patients believed this initial explanation. Many hinted at the possibility that the tablet was a placebo replacing a potent hypnotic capsule. These patients openly verbalized their suspicions when they obtained poor sleep from the glutethimide tablet. Apparently influenced by the popular concept of the "sleeping capsule", many patients questioned the efficacy of a hypnotic given as a tablet. Two patients rejected the tablet with the claim that it was more difficult to swallow than their previous hypnotic capsule. Although onset and duration of sleep were unaffected by the tablet form of hypnotic, the satisfaction quality of sleep appeared impaired for these suspicious patients.

The satisfaction quality of sleep fluctuated with the patient's relationship to his ward physicians. Some of the patients showed a definite distrust of doctors which was increased by the experimental atmosphere and the special attention paid to the patient's sleep. The patient's high index of suspicion tended to impair the satisfaction quality of glutethimide induced sleep. This reaction might not be found in non-hospitalized private patients purchasing their own hypnotics which had been prescribed by their family physician.

Three women in this clinical study clearly illustrated the importance of these qualitative factors and their interrelationship. These women obtained satisfactory onset and duration of sleep from a 250 mg. dosage of glutethimide. However, their previous hypnotic had induced a slightly more rapid onset of sleep than the 250 mg. glutethimide. This comparatively delayed onset of sleep with glutethimide produced strong dissatisfaction, and consequently the dosage was increased to 500 mg. With the heavier dosage onset of sleep was still delayed in comparison to the onset with secobarbital, and these women considered their glutethimide induced sleep unsatisfactory. Evidently a very rapid onset of sleep had great satisfaction value for these patients. Two of these women reported mild side effects from the 500 mg. dosage and expressed stronger feelings of dissatisfaction with their glutethimide induced sleep. The tablet appeared weaker in its hypnotic effect while simultaneously producing side effects. These patients seemed determined from the outset to be dissatisfied with the experimental drug. They showed hesitation on entering the study, suspicion of the doctors, and qualms at being placed in the special group with the consequent increased attention; in addition they questioned the new tablet and attributed peculiar significance to the change from capsule to tablet. Their negative attitude appeared related to their distrust of the clinical situation and heightened by their being placed in an experimental group.

The significance of the experimental atmosphere with its tendency to increase the patient's suspicion suggests modifications in the experimental design. Dispensing the experimental drug in the same form as the previous hypnotic would lower the level of suspicion; and the addition of a placebo to the clinical study would help to point up the suggestive factors in hypnotically induced sleep. Having the patient give his subjective report to the ward nurse as part of the usual hospital routine and eliminating the personal attention and questioning of an investigator would also reduce the patient's apprehension attached to the experimental atmosphere.

This study points up the importance of considering the subjective impressions of sleep in a clinical evaluation of a hypnotic and the limitations of an evaluation based slolely on the quantitative features of onset and duration.

Evaluation of glutethimide. Glutethimide, α-ethyl-α-phenyl-glutarimide (Doriden, Ciba), was clinically evaluated in 25 patients for a total of 455 nightly trials and was found to be an effective hypnotic drug in dosages of 250 mg. for women and 500 mg. for men. The 500 mg. dose appeared effective in producing rapid onset and satisfactory duration of sleep when patients were not suffering from great pain or emotional distress. Increased dosages of glutethimide above 500 mg. did not produce a proportionate improvement in the onset or duration of sleep. In the presence of marked physical pain or severe emotional disturbance, glutethimide in varying dosages was no more or less effective than comparable dosages of the other hypnotics (secobarbital and chloral hydrate) evaluated. Increased dosages of glutethimide and repeat doses were required for patients with severe physical disease or emotional disturbances, and poorer hypnotic results were obtained in these patients. The

hypnotic efficacy of glutethimide appeared more related (inversely) to the severity of patient's physical disease or emotional disturbance than to the dosage of drug. There was a minimum of side effects with glutethimide even with heavier dosages. No side effects were reported in the 250 mg. dose, and they were negligible in the 500 mg. dose for men. There was a complete absence of toxic effects with these dosages. A very heavy dosage of glutethimide produced clinical signs of toxicity in one patient. The hypnotic effect from a 250 mg. dose for women and the 500 mg. dose for men compared very favorably in onset and duration with the hypnotic effect from 1½ grains secobarbital. However, the onset of sleep with secobarbital was slightly more rapid. In the emotionally disturbed patients in the psychiatric hospital 500 mg. and 1,000 mg. glutethimide appeared to approximate 1.0 to 1.5 grams chloral hydrate in hypnotic effect, although the hypnotic effect was poor with both types of hypnotics. When the glutethimide induced sleep was compared to sleep induced by other hypnotics, most of these patients preferred glutethimide. The satisfaction quality of glutethimide induced sleep varied inversely with the patient's degree of physical pain or emotional disturbance, the presence of side effects, and the patient's index of suspicion and distrust of the doctor.

Summary

The methodologic problems in the clinical evaluation of sedative hypnotics have been pointed up with the need for qualitative as well as quantitative studies of sleep for a comprehensive approach. The satisfaction quality of hypnotically induced sleep was investigated with an attempt to analyze some of the quantitative variables and qualitative features of this facet of sleep. It was seen that the satisfaction quality had many individual, peculiar and variable features, many of which could not be understood outside of the personal value and significance that hypnotically induced sleep held for the patient. A new type of non-barbiturate hypnotic, glutethimide, α-ethyl-α-phenyl-glutarimide (Doriden, Ciba), was investigated and found to be an effective hypnotic in dosages of 250 mg. for women and 500 mg. for men, producing in these dosages effective hypnosis with good satisfaction quality with a minimum of side effects and absence of toxicity. The concept of satisfaction quality has the practical value of highlighting factors influencing the patient's acceptance or rejection of the hypnotic.

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In addition to performing its special function, every profession makes its indirect contributions to life. The trained mind not only fulfills its necessary and specific services but other tasks with distinction and in a manner more or less peculiar to itself. When anyone, either within the professions or outside them, becomes an artist, he colors his art from all the chief phases of his experience. It has repeatedly been observed that mathematicians are often skillful and fastidious musicians. Those masters of forensic disputation, the lawyers, have achieved more than might be presumed their share in caricature and in the theatrical arts. That many doctors entertain themselves and others as painters has long been recognized. Similarly, the literary contributions of physicians have often been noted, but the peculiar character of their work has been relatively little observed. The general nature of their offering is well seen in the instance of a contemporary American poet and physician, the scholar and psychiatrist, Dr. Merrill Moore. In his writing is found much that the modern physician might reasonably be expected to give mankind on turning from his professional techniques to the broad world of art and to men's common concerns. Both the man and the scientist are disclosed in his books.

Although much that Dr. Moore writes is distinctively modern, his position as a liberal thinker and progressive artist is best examined with some background of the imaginative writing of physicians in general. In what respect or degree, then, is this biographical feature important? Some doctors in their imaginative writing use their medical ideas and experiences much more literally than others. These author-doctors write barely disguised medical biography or autobiography or present the public with examples of social problems posed by medicine and public health. This course, representing the most direct extension of the medical tie, is often taken by men overwhelmingly absorbed in affairs of their profession, so that their imaginative work might better be described as popular propaganda for their medical selves. At the opposite extreme stand several celebrated poets, Goethe being conspicuous here, whose literary labors are deeply indebted to an early medical training, though the medical profession has actually been practised briefly or not entered at all. Of more value for the present discussion are physicians of life-long practice who have also excelled as writers, preserving a certain balance between their two concerns, though the doctor-author is usually remembered by posterity more as author than as doctor. As a rule both his life and professional research deeply influence his literary work.

Medicine calls for a peculiarly strong awareness of the realities of the physical world. Doctors seem rarely to have produced literature of the most fantastic character, as "Alice in Wonderland". Nevertheless, if doctors are not foremost among surrealists or masters of fantasy, neither in the long run are they lacking in their full share of the poetic. It is well known, to be sure, that men trained in medicine have been eminent as writers of prose, as Theophrastus, the classical psychologist who first established the literary type of the "character sketch", Chekov, the great playwright, Somerset Maugham, the novelist. But from the earliest times doctors as humanists have also not infrequently excelled in poetry. Lucretius may be regarded as thoroughly versed in medicine; that incomparable master of poetic prose, Sir Thomas Browne, was a practising physician. So was one of the chief English "Metaphysical" poets, Henry Vaughan; so was that gifted poetical contemporary of Samuel Johnson, Dr. Mark Akenside; the graceful versifier, Oliver Goldsmith; the Romantic lyricist, Thomas Lovell Beddoes; the American poet-wit, Oliver Wendell Holmes; and so are two of the most rewarding poets in America today, William Carlos Williams and Merrill Moore. As the most deeply human expression of the humanities, true poetry has by no means escaped the hands of these thoughtful and sensitive men.

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In what respect has their profession influenced their poetry and their philosophy, their views of beauty and of life? Widely as all these men differ from each other, that which they share in common is strikingly epitomized by Doctor Moore, so that we may turn to him with expectation of peculiar profit. It is not necessary to regard him as the chief living poet also a physician; it is only necessary to observe him as one of the most broadly representative. This article aims to give a well-rounded picture of him as a poet but, in deference to THIS JOURNAL, is designed primarily to reveal the important features of his art and thought deriving from his medical practice and in general duplicated in the work of others of similar background, both of past and present.

Although Doctor Moore was a poet before he was a physician, his duality stems not only from his childhood but from family tradition. His father, John Trotwood Moore, who resided near Nashville, Tennessee, was one of the most successful writers of fiction and verse in that section of the country 50 years ago. His talents were, if possible, even more various than those of his son. He was official historian of the State of Tennessee (as was Merrill Moore's mother after her husband's death), editor of an influential magazine devoted to animal husbandry, an experimental farmer and spokesman for the new scientific agriculture at that time invading Tennessee. The roots of Merrill Moore's interest in natural science derive from early childhood. His fondness for chemistry, psychiatry and psychology dates from adolescence. At its inception he was the youngest member of "The Fugitives", the well-known group of poets and critics of poetry formed in Nashville in the 'twenties', in the brief course of its flourishing to contain Allen Tate, John Crowe Ransom, Robert Penn Warren, and others of marked distinction in the literary world. Moore began his serious writing and publishing of verse in 1922. Six years thereafter, while still in Nashville, he completed his medical training, after which he moved to Massachusetts, where he turned to psychiatry. He promptly began the writing of articles on general medicine and on the special field of his election. Several of his early publications represent his chemical studies; as years advanced, he increasingly inclined to those fields of psychopathology where relations of mind and body are the most intricate, to problems of dipsomania, drug addiction, and suicidal depression. As both Doctor and Colonel Moore, he had a long and arduous service in the Pacific theater during the Second World War, which led to contributions of several papers on mental hygiene in the armed forces. He has written extensively on matters of public health and participated in many enterprises to this end. For several years he taught in his major field at Harvard University.

It is unnecessary to enlarge on the annals of his equally copious literary activity. This has been, however, limited in at least one respect, since all his dozen books of verse consist of sonnets, while in other types of verse or in imaginative prose he has done very little. He has written an almost incredible number of sonnets, many, however, using the form with much freedom. Over two thousand have been printed and well over fifty thousand sketched. His chief books are *M: a Thousand Autobiographical Sonnets* (1938) and *A Doctor's Book of Hours* (1955), the latter consisting of 365 poems. Among his publications of the last decade are *Clinical Sonnets*, *More Clinical Sonnets*, *Illegitimate Sonnets*, *Case Record from a Sonnetorium*, and *Verse Diary of a Psychiatrist*. His early volume, *Six Sides to a Man*, considers man in relation to his mind and five senses. It would be an understatement to say that Merrill Moore as a poet at any time conceals from his readers the practice of his profession.

One of the leading characteristics of his poetry has already been mentioned, a keen sense for reality as regards man and the physical world. The poems show the frank and direct observation befitting a physician. Although many are studies of illusions or delusions, they are realistic studies in these fields. They are not on this account dogmatic or unimaginative. Rather, they gain a literary force through this convincing naturalism. Each achieves a generalizing or imaginative power through its central, guiding symbol. The style, then, avoids a crude or meaningless naturalism, attaining instead a significant realism.

To his unorthodox poetry Doctor Moore also transfers the objectivity typical of the doctor, who, in his professional life, examines bodies and minds of others, or if he requires

similar attention himself, is by long custom led to guidance not from consultation with himself but with a fellow-physician. Objectivity, even in the psychiatrist, is conspicuous in the very nature of the doctor's task. When Moore terms one of his collections "A Thousand Autobiographical Sonnets", he uses the key word freely, in recognition that all consciousness of experience is in this sense autobiographical. The objectivity appears in the effort to report even the most personal experience in a truthful and an impartial manner. His verse is thus the antithesis of romantic exhibitionism, self-revelation or lyrical subjectivity.

It is further of special interest that his poems most clearly reflecting a personal mood are as a rule among the slighter pieces, dealing with a passing state rather than with an emotional crisis. Almost all of the most deeply moving pieces have eyes cast outward upon the poet's fellow-men. They are his eyes, not the narcissistic sensations of the egocentric, as represented in so much poetry since Baudelaire and that of Mr. T. S. Eliot, who afford some of the most memorable examples. In this respect Moore writes out of the physician's philosophy. His poetry, closer to fiction than to autobiography, proves in this regard unrepresentative of the leading current fashions. But many distinctions between verse and prose as now frequently seen may rarely be encountered a generation hence. Moore's medical mind could in this instance be prophetic.

Other qualities of his poetry directly related to his profession spring from his emotional attitudes towards the dramatis personae who play so large a part in his subject matter. He no more identifies himself with his subjects than the physician identifies himself with his patients; yet on the whole he is sympathetic with them, as the successful doctor must be sympathetic and friendly. Although Moore can write bitter satire, he is generally compassionate and in an evil situation is more likely to discover pathos than sin. He can be moral but never seems obsessed with morality; tender, but rarely if ever reduced to sentimentality. The very brevity of his poems discourages the utmost tragic intensity.

Other similar factors make for an outlook agreeable to classical and to medical values. Moore is deeply moved by the tragic and comic, by the tears and the hilarity of life; moved but not overwhelmed by them. He dispenses with theatrical abandonment. In this balance one detects a basic civilized urbanity and the doctor's poise, a mental attitude always friendly to exuberant good health and yet always acutely aware of man's pathological conditions. The doctor cannot be carried away either by one or by the other. His calling compels him to keep extreme emotionalism in check, to give way neither to reckless joy at a successful childbirth nor to reckless grief at a private death or public disaster. Much like the captain of a ship, the doctor must discipline his emotions. Such discipline is not, as might too hastily be assumed, antithetical to the demands of art. It merely guides art into provinces not always familiar to it but nonetheless within its legitimate domain. This land of poise that is nevertheless agreeable to warmth becomes the particular territory of Doctor Moore's verses. Art itself here emerges as the Middle Kingdom in the emotional life, neither the emotional extravaganza of a popular romanticism nor the cool objectivity of a pure rationalism. Such writing, in fact, maintains a position extremely convenient for the aesthetic theorist to defend.

His considerable quantity of humorous verse, reflected even in the recently-mentioned titles of several of his books, complies with a trend observable from first to last in imaginative writing by medical men. Theophrastus, Rabelais, Goldsmith, Holmes, William Carlos Williams, to mention but a few, are all notable as humorists. Of course only a rash optimism could ascribe a sense of humor to all physicians! But if the physician is imaginative at all, and especially if he is gifted as an imaginative writer, he is more likely than not to have a well-developed humor. After all, the very word "humor" itself has a medical derivation. The attitude is to be explained as the doctor's basic compensation, or as an essential protection against the misfortunes which his profession forces upon him. No shield like comedy against the persistent pressure of sorrow. A drastic personal crisis may instruct the individual in the defensive bulwark of tragic awareness, but daily ills are best met psychologically by the active and spirited counter-attack of comedy. To this truth Moore's poetry bears abundant witness. The casual

reader easily misconstrues much of it as conventional light verse. Its roots, however, go much deeper into the urgency of the Comic Spirit and the wisdom of the humane practitioner.

Moore writes both artfully and naturally, avoiding equally the technical language of science and the technical jargon of an over-self-conscious literature. But this openness by no means signifies that he has forsaken either the course of good literature or the obligations of the physician. Literature becomes meretricious when it is "literature", when it employs a language of sterile literary tradition or of current affectation. Better, perhaps, to write even poetry in the simple and direct speech of a physician giving clear and friendly advice to a patient. In an age of specialization and above all in an age beset by bourgeois barbarism, when the arts have so often been exiled from the public places and driven into secret cells, into the haunted cellars of a left bank, a Bohemian village, a respectable Bloomsbury, or an academic Greenland, the drift to cultism has frequently proved irresistible. Whatever may be true of the novelists, the poets tend all-too-often to a language unknown to the general reader, in fact, not infrequently grasped only by the writer himself. We have the logical absurdity of a private speech, based not so much on superior sensibility to life or language as on superior egoism and self-concern, a soliloquy without an audience. Little in the life of the practising physician encourages so fantastic a non-communication.

Moore's language, then, is not so much amateurish as it is public, nor is it as a rule so public as to lack distinction and fall into vulgarity. It dispenses with a prevalent vogue for deliberated eccentricity. More than once, when literature has tended to exclusiveness, it has been returned to more fruitful courses by those practising it not as a vocation but as an avocation. Such pioneers are not so much vitiated by amateurishness as vitalized by a free air sweeping away cultism and current affectations. When in the course of literary events it becomes timely for style to cast off a decadent lingo encrusting it, destiny often points to the non-professional. Rabelais was such a voice in the sixteenth century, as Merrill Moore or William Carlos Williams is in the twentieth. The Frenchman, it will be recalled, taught in a University much distinguished for medical studies, that at Montpellier, receiving his degree as doctor in 1537. Moore himself may be described as the Pantegruel of the sonnet, as happily divorced from literary cultism as Rabelais himself. Literature owes half its splendor merely to such rebellious amateurs, much as the New York theater today owes at least half its distinction to the merely semi-professional theaters well off Broadway. The broad, white way of modern English poetry is, undoubtedly, the waste-land scenery painted by Mr. T. S. Eliot, who combines the traditional languages of poetry and the church, or as Mr. Eliot's New England forebears would have said, "Shakespeare and the Bible." But Mr. Eliot's Shakespeare may stand closer to Shakespeare as "literature" than to the Shakespeare of historical or aesthetic reality, author of racy plays for the Globe Playhouse; and Moore's sonnets may be quite as close to Shakespeare's sonnets as Mr. Eliot's dramas are to the major works of the once popular playwright.

The subject matter of Moore's poetry is more in correspondence with the broad scope of modern scientific inquiry than with those themes for the last few generations customary in the shrivelled poetry of the Western World. Frequently as Moore turns to love, death, nature, his work is by no means focused entirely on these familiar conceptions, nor even when treating them does it follow the well-beaten paths of romantic lyrical tradition. Free not only from confinements of a narrow self-expression but also from those of a restricted view of life, it looks with something approaching the license of prose to the widest imaginable range of themes. Its limits—for it has limits—are determined by the habitual fidelity of the single sonnet to a major symbol rather than to any restrictions whatsoever on the general type of subject matter. Moore proves refreshing rather than revolutionary in his basic technique but becomes an active champion for the scope of poetic vision. His figures combine the psychiatrist's symbol with the poet's metaphor or fable. Unquestionably, much of his scope derives from his scientific outlook. Moore cannot be supposed to have explored all areas traversed by science, yet few people have examined so many as he or considered them with greater regard for their

human values. Hardly ever trespassing upon technical language or the more recondite of scientific theories or ideas, he turns with a poet's eye to any number of provinces that science investigates. The spirit instead of the letter of his writing shows his acquaintance with the social sciences, with medicine, chemistry, physics, astronomy, geology, botany, zoology, anthropology, genetics, psychiatry, mechanics, engineering.

Above all, his poetic mind is marked by his acquaintance with science's pragmatic manner of approaching reality. Nothing, apparently, is too large or too small for his attention, which in this respect suggests the dual influence of telescope and microscope. Similarly, he is haunted by impressions of time; his first book bears the title, "The Noise that Time Makes"; and his manner of comprehending time strikingly shows his understanding of it as known to astronomer or geologist, psychologist or psychiatrist. His awareness of both space and time accordingly owes much to his addiction to scientific thought. His liking for history is also conditioned by his acquaintance with the more nearly precise types of thinking. To a careful eye, perhaps nine out of ten of his poems show traces of his scientific outlook. In this regard he is, of course, not intrinsically unique, though few poets show these influences so strongly or comprehensively.

His general evaluation of life further suggests his indebtedness to the salutary medical mind. Although the poems represent a wide variety of moods, they incline towards meliorism or possibly even an optimism akin to the philosophy natural to the physician, who commonly assumes the existence or possibility of a state of *sanitas*. Health becomes the not impossible goal of his profession. The pessimism frequently found clouding the modern poet's world by no means dominates the world of this physician-poet. Actually, his world is of all shades and colors, with no attitude habitual. Above all, there are no panaceas, those solutions so notorious in quack medicine, so far removed from a valid therapy. Instructed by the ironies of reality as revealed by science, this psychiatrist well knows complete mental health to be an unreality or abstraction since in the economy of the mind some distortion, however slight, appears necessary to incite the spirit to its maximum achievements. Despite his conviction of the realities of good and evil, small trace of crude didacticism exists in his verses since, instructed by science, he realizes life as too complex for the old-fashioned resounding conclusion. He deserts the old rhetoric of good and evil in order more fully to grasp their modern reality.

His most recent volume, "A Doctor's Book of Hours", best reveals the relation of his scientific thought to his poetical self, as a rapid survey of its contents shows. Here 365 poems are gathered into 12 groups, each group having direct bearing on his medical or scientific outlook. Needless to say, Moore nowhere launches an attack upon the scientific or pseudo-scientific ways of thinking, as does his witty though possibly superficial colleague in verse, Mr. E. E. Cummings, thus prolonging a nineteenth-century war between poetry and art upon the one hand and science and reason upon the other. The absolutism that William Blake so rightly distrusted in the arrogant science of his own day no longer pertains in view of our mysterious universe as seen by Doctor Moore, spokesman for an Einsteinian age of science committed to relativity. Everywhere his view of science is positive, nowhere dogmatic. Two groups of poems use the insights of psychiatry to dissect in turn the souls of men and women; and of similar outlook is a frank section dealing with sex and still another group of poems explicitly "clinical". The section most obviously inspired by the scientific imagination deals with natural history and its power to fertilize the poetic and the human imagination. A group on the poet's mind dissects this mind with Freudian shrewdness and sagacity. A highly indicative cluster of sonnets contemplates modern, mechanized travel with a frank scrutiny of its physical details and their psychological implications; these pieces are eloquent in exposing the scientific practice of extracting enlightenment from casual and unexpected corners. They show how a new naturalism, basically much more critical than the bourgeois "realism" of the last century, uses surface manifestations, passing phenomena, to detect realities well beneath the surface of either place or time. Many of these poems of passage may be described as unassuming verse with weighty implications. Without lifting his voice and with a new gesture of urbanity, the scientist is able quietly to express ideas of

much significance. No rhetoric need be where the selective fact, or symbol, speaks for itself. The physician discovers the deepest meaning in a sign that appears utterly casual and insignificant to the untrained eye. It is hardly excessive to call such verse poetry in a new key.

The same peculiarly trenchant realism characterizes the groups of poems analyzing war and violence, public affairs, city life, and the impact of death. All such areas of experience appear in startling close-ups yet are placed in a context as broad as the speculations of the ethnologist. Public affairs bear for Moore a fairly close resemblance to the problems of public health that he knows so well. War and violence he sees with the intimate knowledge of a soldier who has been in the field, ministering to the mental and spiritual needs of hard-pressed men, or with the intimate knowledge of the specialist in dipsomania, closely acquainted with many of those violent accidents that may be seen as minor replicas of the catastrophic collisions of the colossi of politics. Doctor Moore as poet writes on city life with the serious concern of one who has long tended its harassed nerves and psyche. Death signifies much to him as it naturally means much to the physician whose efforts are so largely spent to stave it off. And as a physician of the soul, he knows the force of the shock upon the survivors, as well as the dread (or love) of it in the threatened victim. With the curious imagination of the poet and the trained discernment of the physician, he exposes death's anatomy. Many times this man of many adventures has himself involuntarily winced at its sudden menace. The ultimate theories of theologian or philosopher, which so largely possessed the mind of the poet of *In Memoriam*, are for him superseded by actualities and researches that compared with Tennyson's speculations are far closer to the mind of psychiatrist and physician. Finally, the last group of poems, that dealing with the most general ideas of which Moore is capable, once more show how deeply his reflections have been swayed by his scientific thought. His views are, on the whole, those of the American pragmatists, from William James to John Dewey, thinkers whose ideas on almost all matters, religious, aesthetic or political, were largely influenced by their interpretation of the world as seen by modern science.

Granting the multiform influences of scientific thinking upon Moore's poetry, the question naturally arises as to whether these influences have on the whole been detrimental or salutary. To a conservative taste it doubtless seems the former. Some thinkers distrust the relativistic climate of ideas; a larger proportion distrusts its climate of taste. Under its dispensation art has been thought to lose its centrality, its passionate, dramatic or epic depths, and to be fractured into vapid and anarchistic Expressionism. Moore's emotion is held to lack concentration, his expression to be defective on the same charge. His work appears prosaic, or, to put the case quite differently, the disciplines of seer and artist are held vitiated by a new secularism or vulgarism that is obviously not itself science, however much the light of science casts ironic beams upon it. We are told that he is a garrulous doctor who keeps, as he should not keep, his diary in rhyme. Such is the devil's case, which has been ably stated in Professor Yvor Winters' criticism of Doctor Moore's verses. They have been assumed to be the carefree quickies of a physician driving to and fro from work, created, no doubt, in the changes of the traffic lights.

On the whole, Moore's poetry has fared neither remarkably well nor ill at the hands of the critics. A few, as Dr. William Carlos Williams, have praised it as highly as Professor Winters has damned it roundly. For a poet living today, Moore has had a very fair number of readers. It is scarcely to his discredit that he has been read more often in his books than in those short-cuts to culture, the anthologies. As a poet he seems definitely with us to stay.

One curious consideration points to the actual compilation of his volumes, which has seldom if ever, been at his own hands. Contrary to frequent uninformed statements, Doctor Moore revises many of his poems, but the busy physician finds no time to assemble the works that the artist so prodigally creates. Consequently, he has relied on his friends to select and arrange for publication roughly five per cent of the manuscripts. The task has, naturally, been performed with varying degrees of success. Also, Doctor Moore's style has itself developed from a manner more or less

moist and romantic to one dry, sharp and modern. The quality of the wine has changed to some degree with the changing times and with Doctor Moore's own wider and deeper understanding of the application of scientific ideas. Although at no time has he himself analyzed his writing in precisely these terms, he has—with memory, perhaps, of his extraordinary father—emphatically regarded himself as essentially not two, or two-score, persons, but one, which in itself at least implies, if it does not state, an integration between coexistent parts. Almost instinctively, he regards these parts as complementary to each other, not as hostile. His latest and surely his finest book best represents the harmony between science and poetry, a condition indicated by its issue from a medical publisher.

The proof is in the eating. In the course of years this book, new in kind as modern science and society are in so many respects new, will undoubtedly receive both harsh and friendly comments. It may or may not be a landmark in American poetry, but it is, I believe, a touch-stone. Too much contradiction of current fashions in literary taste may moderate its success for the time being. The style is, on the whole, without pronounced "density". For reasons already noted in this article, the emotional wavelength is possibly more readily captured by the amateur or general reader than by the professional critic. Professor Winters thinks it is off key. The present writer believes it to be poetry in a new key and finds the classically-minded professor chained, Andromede-like, to the rock of conventional opinion with no friendly Perseus to effect his rescue. Such matters of taste are not to be concluded hastily nor dogmatically. But it is surely not impossible that Doctor Moore's work discloses a new and an unexpected vitality in poetry effected with aid from science, thus bringing the lover of poetry today into a fresh contact not only with the aesthetic experience but with the experience of living in the only age wherein he can live fully, his own.

Even though Moore's critics have seldom noted the relation between physician and poet, it is this relation that in fact provides much of his art's peculiar tang and value and that, virtually unmentioned, has often in the eyes of conservatives, or belles-lettristic readers, militated against a cordial reception. Fully to explain this situation it is necessary to glance backward through two centuries. The literal-mindedness of neoclassicism opened the gates to a surprising amount of incredibly dull poetry with a medical subject matter and in time reacted violently against the notion of the doctor-poet in particular and of science in poetry in general. Beginning with the Renaissance, a spate of didactic poems appeared on such melancholy matters as syphilis, the spleen, the dispensary. In the seventeenth century, Phineas Fletcher composed a chilly poem dealing incidentally with the circulation of the blood. In the eighteenth century Charles Darwin's grandfather, Erasmus Darwin, wrote a long verse treatise on the evolution of plants and their relations to mankind. Hence the doctors seemed to William Blake the very bulwarks of bad art, bad morality, bad philosophy. They epitomized prose and materialism. Neither John Donne nor John Milton would remotely have entertained so drastic a thought. Although a few poets, as Goethe and Shelley, found in science an agreeable ally, most poets followed John Keats in assailing it as their inveterate foe. To judge merely on the basis of recent performance, the case at about 1800 against the doctor in verse, with aesthetically repulsive examples literally strewn through the preceding century, seemed almost inescapable. The Romantic Period, then, easily won a decision against the scientist's learning and in behalf of an innocence of science. Even Mr. T. S. Eliot and Mr. Ezra Pound seem not to have deserted this too familiar ground. But in a view that embraces long centuries before the just-mentioned dispute and in a view that envisages the probability, if not the necessity, in the future, another conclusion readily presents itself. How can poetry live and close its eyes to a world throbbing with atomic power? Doctor Moore reminds us at least of a good possibility for a harmony, a coexistence. The two ways of thinking are, indeed, distinct, and history eloquently warns us that they should never be confused. Science, for example, leans upon the more exact statements of mathematics; poetry, inevitably on the less precise statements of words. Yet words likewise have their precision, as science also demands intuition. Our poetry may well become not only

more modern but better, stronger and more desirable by gathering hints from the practice of this singularly complete human being, Merrill Moore. He becomes a leading instance of a profound realignment. More the research scholar and less the representative avant-garde artist than Dr. William Carlos Williams or any other distinguished figure coming readily to mind, Doctor Moore best personifies an harmonious readjustment in terms of the age of Einstein between science and the common man, between the new knowledge and our hard-pressed souls, between the material therapy of medicine and the spiritual therapy of art.

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SORORITIES, A PSYCHIATRIC APPRAISAL

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This is a subject which may be discussed emotionally at some length since most people who have an opinion hold it rather strongly. It is not intended that this paper should defend a bias, but rather that an attempt should be made to clarify the problem as it is seen and to point out the emotional effects on those rejected. The problem seems likely to be aggravated by an increasing college enrollment and may, therefore, be a cause for concern to more patients and on occasion to members of the physician's family.

It is felt that undergraduate social sororities and fraternities affect emotionally in some degree *all* the students enrolled in a university where such organizations exist.

To gain an impression of the situation prevailing today, letters of inquiry were written to the deans of women of 17 colleges in various parts of the country. For the most part, the 16 answers received were detailed, exact and helpful. The impression gained from this small sampling is as follows: in the larger state universities having a total women's enrollment of 1,000 or more, about 38 per cent of the girls are sorority members; while in the smaller schools, as high as 81% of the undergraduate women are members.

One of the questions asked was whether there was any record of a disastrous consequence resulting from a girl's failure to receive a bid. The answers to this question varied from an unqualified "no" to a frank admission that some disappointment and bitterness are inevitable in rushing. A frequently given cause for disappointment in rushing resulted from an uncompromising preference for some particular group. This preference in some instances was attributed to a mother's undue emphasis.

The question was also asked if there were figures available as to the relative social activities of the independents as compared to the members of the sororities. In no instance were exact data available, but the majority replying believed the sorority members had more social opportunities and activities. This lack of attention to the students' extracurricular hours by the university increases the importance and competition for sorority membership.

Again, it is not within the responsibility of this appraisal to defend an opinion as to whether national undergraduate social sororities are good or bad; they exist and show no evidence of ceasing. It is within the scope of this paper to point out that any social group, whether national or local, existing on a campus remains the responsibility of the university.

The "independent" freshman girl without the benefits of a group which attempts to provide her with dates, opportunities to become acquainted, and planned social functions may find her independence of little help in adjusting in a large university. She may enjoy dating and dancing, but if she is one, of between three and five hundred freshman girls, at a strange school, away from home for the first time, she may not know exactly how to proceed in getting acquainted. She may have entered the university with 3 or 4 close friends from high school; however, if they pledge sororities and she does not, then she is barred from their social activities and can hardly be unaware of not belonging. This relative isolation socially from her friends who are pledged may be detrimental to her developing self-confidence and may be emabrrassing to explain both at the university and when she returns home.

The effects of "not belonging" must be evaluated with particular attention to the age of the girl and the circumstance in which these effects occur. It is difficult for the girl to minimize to herself the importance of belonging to a sorority in the face of all the emphasis competitive rushing develops. Such a girl, although she is not a member of any sorority, is still influenced by the existence of sororities at the university. If she is reticent, she may be

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bothered by being asked "what she is" (i.e., to which sorority do you belong) and after graduation, "what she was" by the acquaintances she will make later. She may respond to the question by saying she is an independent, "nothing", or (if she is really troubled) by spending 30 minutes explaining why sororities are unimportant to her.

The larger the university, the freshman class and the dormitory, the more impersonal will the girl's surroundings be. She may be provided with a brochure with the main buildings on the campus numbered, she may have one or more orienting lectures on "life at the university", but she will lack a relatively small group with which she can identify herself with some feeling of belonging and importance. Particularly, she will not have the assurance of being wanted which the sorority pledge derives from receiving a bid.

On the other hand, a girl who has gone through rush either with fear or certainty and then stands by and watches with increasing despair as her friends are accepted and depart to the sorority of their choice, until only an unwanted few remain, may surely know rejection in its fullest sense. The self-esteem of a 17 or 18-year-old girl in such a circumstance may require some time to regain its previous strength. How rare or how prevalent is this occurrence? In 1954 at one university this happened to 123 girls. This did not include an even larger group who became discouraged and dropped out before the end of rush week. Paradoxically, it would seem much less traumatic to be 1 of 123 than to be 1 of only 10. A daughter's undergoing such an experience may not be without its emotional effects on a father or a mother and may precipitate complaints in the parents which the family physician is hard pressed to explain organically.

A girl's social stature may be enhanced by membership in a sorority; this advantage does not end with graduation but may be a continuing aid to her social ambitions. Social success being in some degree the progression through a series of more restricted groups. A not too dissimilar circumstance prevails in medicine from graduation through certification; but the qualifications differ and are more dependent on an individual's performance than his forebears'. However, the place where a man trained and the particular group with whom he was associated are not without some weight although seldom as important as the senior resident believes.

Not too rarely the emphasis on belonging to some one sorority may so outweigh the "intra"-curricular functions that universities are presumed to offer that the student, failing to receive the desired bid, may change schools or return home. In less severe disappointment, the girl may remain unhappily as an independent or as a dissatisfied member of a sorority she considers of lesser rank. In those very rare instances where the girl reacts violently to failure by an impulse to self-destruction or total withdrawal from her environment, factors other than this single disappointment should be sought before placing all the blame on the sorority.

The emphasis on belonging to a sorority does not begin when the girl, recently graduated from high school, pays her entrance fees at the university; rather, it begins in elementary school when the mother attempts to guide her in her choice of friends. The emphasis is increased in junior high school when she joins dance clubs and is augmented further by being pledged into a high school sorority. Finally, the relative importance of sorority membership is crystallized at the rush parties which she attends during the summer before entering college. If, during the progression through these stages, the girl has had one or two particular sororities stressed by her mother and friends as the only ones she should pledge, she may have difficulty in adjusting even if she does receive a bid from a group which is her second or third choice.

A member's responsibility to a sorority is not presumed to end with graduation, and the active participation and interest of the alumnae in a chapter are not without bearing on their selection of pledges. Therefore, the competition for a bid from the most sought after sororities does not depend solely on the qualifications of the girl. Such factors as being a daughter or a sister, having strong alumnae support, having close and aggressive friends who are active members of the chapter, are very desirable qualifications. The girl going through rush should be informed of this officially by the university to prevent her assuming her failure is due to some personal defect.

It seems unlikely that sororities are of divine

origin and may therefore be presumed to have arisen as a consequence of girls of similar age living in the same area for 4 years.

That groups with similar interest would form is inevitable. It is not unusual that signs, symbols, and rituals of initiation should have evolved to bind the members more closely and thereby preserve the group as an entity.

There is academic competition among the sororities, and the social life apparently does not interfere scholastically since the members' grade averages are usually equal to or above those of the non-members. If the school permits the members to live as a group and to own a residence, the "sorority house" may become the center of school life for the freshman girl. Therefore, it is not surprising that her later, most pleasant recollections are not associated with the lectures she attended but with the "sorority" to which she belonged. It also follows that she may consciously or inadvertently unduly stress the need of being a member to her own daughter. Luckily, the most desirable one attribute a girl can possess to assure her receiving a bid is that quality of being a daughter of an alumna.

The larger the enrollment, the less unity and group activity a freshman class can have; and the more desirable it is to have some smaller social group with which the student can be identified. This may be done on a basis of housing; but again, such extremes in living arrangements as having 500 girls in one dormitory and another girl living alone in an approved room require effort and planning to provide a desirable social group. Shy people seldom enjoy their reticence, and helping a self-conscious girl to become socially at ease could be one of the more valuable assets that a college career might provide. Sororities make this effort for their members; the university ordinarily does not.

Sororities can hardly be deprived of a free choice of their membership, but there should be a sufficient number of bids for all those who wish to join a social group. However, if the university shows as much interest in the independents as the sororities do in their members as individuals, "not belonging" will be of much less significance. All those accepted by a university where sororities exist should be advised of the system of rushing, the basis on which pledges are chosen, and the opportunities available to those who do not join; this should be provided without equivocation when the application for admission is received.

Those who do not participate in rush week should have an equal opportunity to meet other members of their class and to become acquainted. Those failing to receive bids and those who do not finish rush week should be seen individually or in small groups by a physician responsible for student health and preferably by a psychiatrist. This particular emotional trauma may be very disruptive to a girl's mental health; and if personality factors exist which prevent her being acceptable to a social group, then they are better discovered and treated when she is a freshman than during her later years.

What happens to a student after class may be as important to her eventual happiness as what she learns when she attends. There is as great a need for those who are not sorority members (as high as 65% of the girls in some of the larger schools) to participate equally in the social activities on a campus as there is for those who belong. If they do not have the opportunity, the fault lies with the university and not with the sororities. This problem of offering similar group activities is acknowledged to be extremely difficult in the larger schools; but in many, a successful beginning has been made.

The family physician may be seen by a girl for a physical examination prior to leaving for a university. A few brief inquiries as to her plans may allow him to caution against disappointment and to advise that a period of nostalgia is to be expected and endured. It also prepares her to discuss with him any later disappointment she may experience—even if she is his own daughter.

Summary

It is held that sororities affect those students who are not members as well as those who belong on any campus where they exist. It would appear that the larger the enrollment, the more important it becomes for the student to be a member of a sorority or some similar social group. The eventual solution to the problem should depend on the university's taking as much interest in the students' extracurricular life as the sorority does.

BOOK NOTES AND REVIEWS

Books received are acknowledged and given a brief description in this section. Selections serving a variety of interests will be made from these for a more extensive review, as far as space will allow.

BOOK NOTES

Ramon y Cajal, S.: Studies on the Cerebral Cortex. Translated by Lisbeth M. Kraft. [Chicago: The Year Book Publishers, Inc., Pp. XI + 179: 108 figures, 1955, $5.00.]

This study of the cellular structure of the limbic lobe which includes the hippocampus and Ammon's horn is a classic and should have been available in English long ago. Quoting from the translators foreword "In 1951, in anticipation of the hundredth anniversary of the birth of Santiago Ramon y Cajal, it was decided to translate into English his papers concerning the limbic cortex. These may be found in the Trabajos del Laboratorio de Investigaciones Biologieas de la Universidad de Madrid, Tomo I, 1901–2. . . . Portions of them have been available in German translation for some time. In presenting this material in English, an attempt has been made to preserve, wherever possible, the historical qualities of the original publication."

Evidence that the limbic cortex plays an important role in visceral activity and associated emotional changes has been accumulating, thus increasing the need for the information and stimulation this translation of Cajal's masterful studies affords. The text reads easily and is apparently very well done and, as is usual with Cajal texts, the original drawings are works of art and accuracy. It is a book that represents the results of intensive faithful research that is pertinent to present-day researches as well as valuable from the historical viewpoint. The translator and the publishers have done neuroanatomy a great service.

Lups, S. and Haan, A. M. F. H. The Cerebrospinal Fluid. [Amsterdam and New York: Elsevier Publishing Company, Pp. XV + 350: 93 figures, 1954, $9.50.]

For some time a comprehensive new reference book on the cerebrospinal fluid has been needed by neurologists and psychiatrists and particularly by laboratory technicians involved in diagnostic tests in this field. This survey of cerebrospinal fluid characteristics and disorders in health and disease is presented in four extensive chapters. The first deals with anatomical and physiological aspects, the second with the technique of lumbar and cerebral punctures and the third with diagnostic features in general and of the usual neurological disorders for which spinal fluid studies are indicated. The fourth chapter describes the methodology of microscopic and chemical examinations of the fluid.

The large amount of essential information contained in this book is so arranged that the particular topic needed by physician, medical student or technician can be readily found. There are several colored illustrations, a serviceable bibliography and an adequate index. It should be a valuable addition to the library of all concerned with cerebrospinal fluid problems.

Swartz, Harry: The Allergic Child. [New York: Coward-McCann, Inc. Pp. xvii + 297, 1954, $3.95.]

The varieties of allergy are numerous and the distribution widespread through the population of this and other countries. The author of this book emphasizes that there are millions of children under fourteen years of age who suffer from allergies in some degree of one form or another, and that early and adequate therapy is urgently indicated if lasting harm is to be avoided in certain cases.

The author recognizes that, among other elements, psychosomatic factors are active in problems of allergy and the text is organized at the level of intelligent parents who as well as the practitioner will find an answer to most of their questions in this field. The thirteen

chapters cover the recognition and therapy of allergic disorders in an inclusive way. The careful clinical observations gathered by the author from a rich experience make the work highly authentic and stimulating.

The glossary and appendix sections cover over 50 pages and afford a great deal of information on foods and other allergy producing substances. The numerous suggestions for practical procedures should be useful to all concerned.

Gillian, L. A.: CLINICAL ASPECTS OF THE AUTONOMIC NERVOUS SYSTEM. Boston: Little, Brown and Company, Pp. 316, 42 illustrations, 1954, $6.50.

The modern attitude of progressive physicians is reflected in the coverage and organization of the text of this unique book. Students of disease are now doing more than lip service to the "organism as a whole" concept. They try to investigate medical problems in terms mentioned in the foreword of the present volume "the effect of the disease on the patient, the effect of the patient on his disease and finally, the patient himself as a temporarily deranged human personality."

Taken as a whole, the text is a concise useful presentation of the known essential facts relating to the clinical aspects of the autonomic system. It is presented in two parts. Part I "Anatomy of the Autonomic Nervous System" comprises about half of the book and includes all of the information necessary for an adequate working conception of the structure and development of this complicated system.

Part II describes the "Innervation of Visceral Organs and Systems with Clinical Applications" taking up each major visceral system of the body in terms of its characteristic disorders.

The illustrations are clear cut, diagrammatic line drawings which are particularly useful for quick orientations. The text is well documented and the book is handy in size and with very readable print. Clinicians whether in private or hospital practice will find the needed review material and instructors will find it helpful in formulating lectures and in interpreting symptoms.

Wilson, S. A. K., NEUROLOGY, 2ND EDITION; Edited by A. Ninan Bruce. [Baltimore: Williams & Wilkins Company, Pp. xxix + 2,060 + 152 index; 279 illustrations, 1955, $37.50.]

This three volume encyclopedic work now appearing in a new edition will be welcomed by neurologists everywhere. It has been 15 years since the first edition became available and therefore a new one was overdue. Published in 1940 by the present editor after the death of Dr. Wilson, the first edition was not quite complete. In the present volume one serious gap has been closed by the fine 70-page chapter on aphasia, apraxia and agnosia prepared by Sir Russell Brain.

Throughout there are excellent descriptions of disease entities, in many respects, the most valuable in existence as Dr. Wilson was a master in exposition. However, there are rather obvious weaknesses that might have been avoided by including some of the more modern laboratory developments in neurology. Many diagnostic tests are missing. Only a few lines are devoted to the EEG in epilepsy, and the modern therapy of this disorder is inadequately handled. Aside from these and a few other shortcomings, the volumes will serve well all those who are engaged in research and clinical practice. This is also a work of singular value for students of neurological literature since there are 238 pages of bibliographical lists arranged alphabetically as to authors. It is hoped that there will be other editions, in due time, of this scholarly contribution.

Williams, R. H., Editor: TEXTBOOK OF ENDOCRINOLOGY, SECOND EDITION. [Philadelphia: W. B. Saunders Co. Pp. 776; 173 illustrations, 1955. $13.00.]

This new, second edition of the "Textbook of Endocrinology" has been prepared by the same editor as the first edition but with some changes in the ten contributors. Dr. William H. Doughaday has written the chapter on obesity formerly prepared by Dr. Newburgh, and owing to the death of Dr. Kepler, the sections on hyperadrenocorticism and hypoadrenocorticism have been written by Dr. P. H. Forsham and Dr. G. W. Thorn. A valuable

new chapter on the diagnosis and therapy of endocrinopathies has been added.

This is an excellent book giving coverage of the entire field of the endocrine glands in terms of the known structure, functions, disturbances, diseases, examination methods and therapy of these organs and combinations of organs. The entire book has been revised, much of the text has been rewritten and all brought up to date with many additional tables and illustrations.

The advances in endocrinology since the first edition of the book in 1950 have been numerous, and Dr. Williams and his associates have accomplished a remarkable task in bringing together the mass of complicated materia. At the end of each section numerous pertinen classified references have been listed, thus enhancing the reference value of the volume It is a real contribution that will enrich th library of any physician or research worke interested in the field.

BOOKS RECEIVED FOR REVIEW
THE JOURNAL OF NERVOUS AND MENTAL DISEASE
November, 1955

1. BALINT, MICHAEL (Ed.) *The Problems and Methods of Psychoanalysis. The Selected Papers of Sandor Ferenczi.* Basic Books, Inc., New York, N. Y.
2. BRAIN, SIR RUSSELL, AND STRAUSS, E. B. *Recent Advances in Neurology and Neuropsychiatry, 6th Edition.* Little, Brown, and Co., Boston, Mass.
3. BURTON, ARTHUR, AND HARRIS, ROBERT E. *Clinical Studies of Personality.* Harper & Bros., New York, N. Y.
4. CAPLAN, GERALD (Ed.) *Emotional Problems of Early Childhood.* Basic Books, Inc., New York, N. Y.
5. DAVIDOFF, LEO M., AND FEIRING, EMANUEL H. *Practical Neurology.* McGraw-Hill Book Co., Inc., New York, N. Y.
6. HAMILTON, MAX. *Psychosomatics.* John Wiley & Sons, Inc., New York, N. Y.
7. KOTINSKY, RUTH, AND WITMER, HELEN L. (Editors) *Community Programs for Mental Health.* Harvard University Press, Cambridge, Mass.
8. MCILWAIN, HENRY. *Biochemistry and the Central Nervous System.* Little, Brown, & Co., Boston, Mass.
9. MODELL, WALTER. *The Relief of Symptoms.* W. B. Saunders Co., Philadelphia, Pa.
10. SAINSBURY, PETER. *Suicide in London.* An Ecological Study. Chapman & Hall, Ltd., London, England.

NOTES AND NEWS

DEPARTMENT OF PSYCHOLOGY THE UNIVERSITY OF CHICAGO

Summer 1956

TWO WORKSHOP SEMINARS IN THE RORSCHACH TEST

I. BASIC PROCESSES. Obtaining and scoring the test record. How to translate the raw free associations into the response categories; and how these interact to form the personality structure. Full case interpretation will be demonstrated. July 9–13, 1956.

II. ADVANCED CLINICAL INTERPRETATION. The very disturbed younger child; the test's prediction and the child's course. Stress, defense, and ego in adolescents and in adults (non-psychotic). Treatment assets and implications. July 16–20, 1956.

DOCTOR S. J. BECK will conduct both seminars. For full information, write to the Department of Psychology, The University of Chicago, Chicago 37, Illinois.

The eighth lecture in the Sixth Annual North Shore Health Resort Lecture Series on PSYCHIATRIC PROBLEMS IN MEDICAL PRACTICE will be held at our hospital, 225 Sheridan Road in Winnetka, Illinois on

Wednesday, May 9, 1956 at 8:00 P.M.

THE PREVENTION OF IATROGENIC DISEASES

will be discussed by

WALTER C. ALVAREZ, M.D.

Professorial Lecturer in Medicine Emeritus, University of Illinois College of Medicine, Consultant in Medicine Emeritus, Mayo Clinic; Editor-in-Chief, Modern Medicine, Geriatrics; Editorial Board of other journals and newspapers.

ASSOCIATION INTERNATIONALE DE PSYCHOLOGIE APPLIQUEE INTERNATIONAL ASSOCIATION OF APPLIED PSYCHOLOGY

The twelfth Congress of this Association was held in London from the 18th to 23rd July 1955, when there was an attendance of 550 delegates. Meetings of the Congress were organised partly as symposia and partly as groups of individual papers related to a particular theme. There were four plenary sessions with symposia on subjects of interest to all in the field of applied psychology, and fifteen other symposia, each devoted to some special theme. In addition there were forty individual papers. There were three evening lectures by Sir Frederic BARTLETT, F.R.S., Professor E. MIRA Y LOPEZ and Professor C. PELLIZZI.

The Organising Committee of the London Congress are proposing to publish a volume of Proceedings which will contain papers in full presented at the Major Symposia, the Opening Session and the three Evening Lectures. Summaries of the other papers will be included. The complete text of some of these papers will appear in one or other of the scientific journals, while the European Productivity Agency will be publishing twenty-one papers which are concerned with industrial psychology.

At the General Meeting of the Association held during the Congress, it was decided to change the title of the Association to: "Association Internationale de Psychologie Appliquée—International Association of Applied Psychology". The Officers of the Association were re-elected as follows:—

President—DR. C. B. FRISBY (London)
Past President—PROF. H. PIERON (Paris)
Vice President—PROF. J. GERMAIN (Madrid)
General Secretary—PROF. R. BONNARDEL (Paris)
Treasurer—DR. M. COUMÉTOU (Paris)

The next Congress will be held in Madrid in 1958 under the Presidency of Professor José GERMAIN. Further details about the London Congress and on the organisation of the next Congress in Madrid will be given in forthcoming issues of the Bulletin of the Association.

This is to inform you that at the Thirty-Fifth Annual Meeting of the Association for Research in Nervous and Mental Disease held

in New York City on December 9 and 10, 1955, the following officers were elected for the year 1956:

President—Dr. Harry C. Solomon
First Vice-President—Dr. Stanley Cobb
Second Vice-President—Dr. Wilder Penfield
Secretary-Treasurer—Dr. Rollo J. Masselink
Assistant Secretary—Dr. Lawrence C. Kolb

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A new type of "total push" program in Veterans Administration hospitals is opening the doors of closed wards for many long-term mentally ill patients, VA announced today.

Successfully tested at the VA general medical and surgical hospital in Albany, N. Y., the program represents one of the first comprehensive attempts to recondition selected long-term psychiatric patients from closed ward status in neuropsychiatric hospitals to open ward status in general medical and surgical hospitals.

The patients generally selected for the treatment are those who have both mental and physical disabilities and who have shown little change in their mental condition after many years of treatment in neuropsychiatric (NP) hospitals.

Dr. Lauretta Bender of New York City has been appointed principal research scientist in child psychiatry, a new position in the State Department of Mental Hygiene, Commissioner Paul H. Hoch announced today.

The function of this new position will be to study adolescents and children and to serve

as a consultant in child psychiatry to the department as a whole, Dr. Hoch said. This position was created under the department's new nine-point intensified treatment program which calls for greater emphasis on research in the emotional disorders of childhood and adolescence.

In her new post, which she will assume in the near future, Dr. Bender will carry out research in the diagnosis, care, treatment, and follow-through of mental illness, emotional disturbances and anti-social or delinquent behavior in children and young adolescents in the state mental hospitals. Two wards at Creedmoor State Hospital, one for boys and the other for girls, will serve as the nucleus for this program

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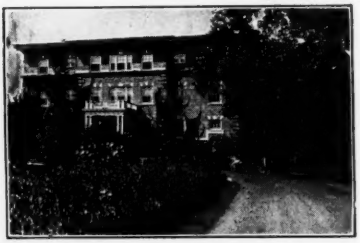

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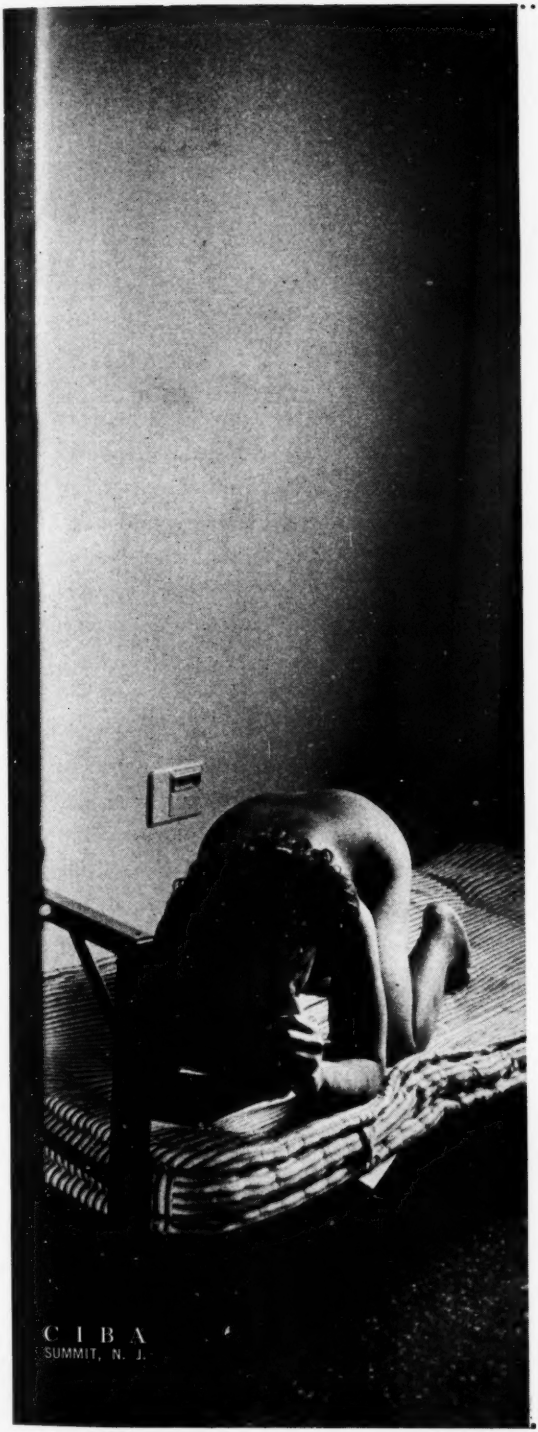

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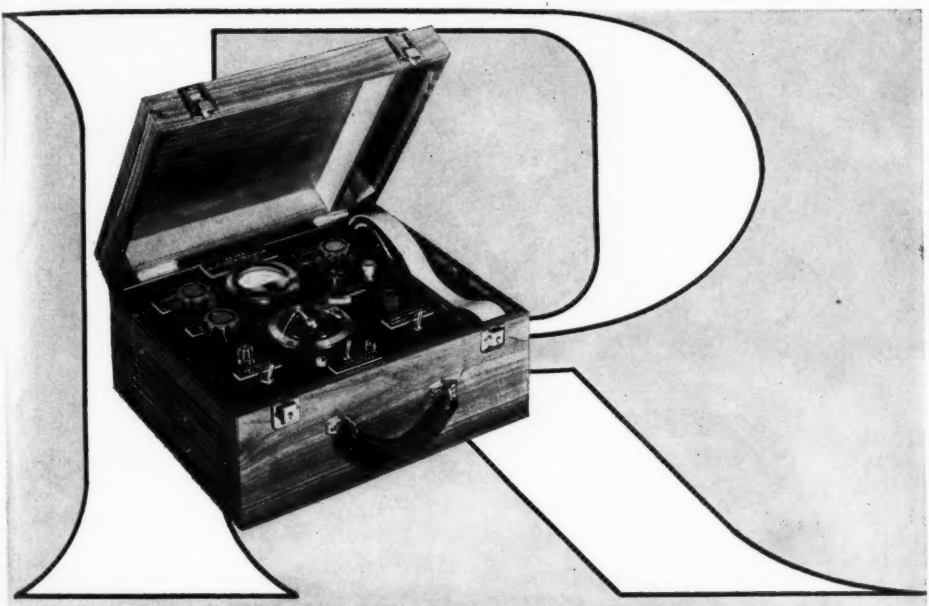

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